THE

OCEAN TELEGRAPH

TO

INDIA

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A NARRATIVE AND A DIARY

BY

J. C. PARKINSON

AUTHOR OF 'PLACES AND PEOPLE,' ETC.

WILLIAM BLACKWOOD AND SONS
EDINBURGH AND LONDON
MDCCCLXX

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PREFACE.

A SMALL portion of the following diary—about a dozen of its pages—has already appeared in one or more of the daily newspapers; the remainder is now published for the first time: and I have the satisfaction of knowing that the enterprise to which it relates has been since its completion in such excellent working order as to surpass all that was promised to the public in its name. At the entertainment given on board the Great Eastern before she left India, the prediction that messages would soon pass between London and Bombay in "about the difference in time," and that the merchant telegraphing from the latter city would be able to count with certainty upon his English correspondent hearing from him at the hour at which his Indian communication was despatched, was received with much congratulatory applause. But Sir James Anderson, the managing director of the British-Indian Submarine Telegraph, has furnished me with examples which prove this prediction to have fallen far short of what has been accomplished. To be exact, a message despatched from Bombay at 12.14 P.M. has, in spite of its having to pass through Italy until the Falmouth and Gibraltar cable is laid, reached London at 9.14 A.M. the same morning; one at 12.11 P.M. from Bombay, at 9.26 A.M. in London; one at 12.52 P.M. from Bombay, at 9.35 A.M. in London; one at 11.24 A.M. from Bombay, at 8.23 A.M. in London,—and so forth; and the statement that the transfer of a message from the part of the office in which it is perforce received at Bombay, to the instruments of the British - Indian Cable Company under the same roof, has been known to occupy more time than it takes to forward the same message from India to London, will sound remarkable to English ears.

It seems that regulations exist in India which have up to this time prevented the Cable Company occupying offices of its own; and the establishment alluded to in my diary as being fitted up while I was at Bombay had to be vacated. Certain authorities appear to have decided that the public interests would suffer if the new line were permitted to ask for custom independently, and the Directors of the Cable Company have been hitherto compelled to put up with quarters provided for them in the Governmental telegraph office. They are far from satisfied with this arrangement, and ask to be set free, and to be allowed to work their own business in their own way. The case of messages being received at the official counter and being detained longer on their way to the adjacent desks of the British-Indian Company than it takes the latter to transmit them through the cable to London, is, one would hope, of rare occurrence; but that such a complaint should be possible, points to the advisability of change. "It is not by the intermeddling of an omniscient and omnipotent State," wrote Macaulay, " but by the prudence and energy of the people, that England has hitherto been carried forward in civilisation;" and though it may be urged that India must be governed on different principles, it certainly seems hard if English traders in an English possession can be compelled to carry on their calling through a department of the State.

In conclusion, I have to acknowledge that I am indebted to two articles which appeared in the 'Times' newspaper in November 1869 and January 1870, during my absence abroad, for a description of the cable shipped on the Great Eastern, and for some other details. Those articles were so complete that I was referred to them by professional authorities for information on my return.

J. C. PARKINSON.

THORNTON HILL, WIMBLEDON,
23*d May* 1870.

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THE OCEAN TELEGRAPH TO INDIA.

INTRODUCTORY.

In Dr W. H. Russell's brilliant record of the unsuccessful Atlantic Telegraph Expedition of 1865, "Forward" is quoted as the last word transmitted through the cable laid between England and America in 1858; and "Forward" is given as "the motto of the enterprise still." The four years which have passed since that history was published have been remarkable for taking the science of submarine telegraphy out of the regions of doubt and speculation, and for establishing it on as firm a basis as the building of houses, the making of railways, or the construction of canals. In this year of grace, if a man were to express serious doubts as to the possibility of laying a telegraphic cable between two countries, because of the vast distance between them, or by reason of the depth of their seas, he would be smiled at as an alarmist or an ignoramus. Until 1866, he who did anything but doubt such possibility ran grave risk of being branded as a visionary. Three lines of cable between Europe and America, all performing their work unfailingly, and being repaired upon occasion without serious difficulty, and cables to and from the chief sea-girt countries of Europe, testify to the reality of the advance of which Dr Russell's "Forward" was the keynote and the prophecy.

By far the greater portion of the line just completed, and which puts India and England in direct telegraphic communication, has been laid more easily than the most sanguine thought possible. Improvements in machinery and in manufacture have done much to reduce the risks of cable-laying when intrusted to skilled hands; and the progress of the Expedition from Bombay to Aden was remarkable for its unbroken calm. Fortunately, too, for the peace of mind of investors, it happened that neither the anxieties under which the Expedition laboured while laying the Suez section in the Red Sea, nor the news of the disaster which detained it, could reach England until the broken cable was picked up and repaired; and it has seemed therefore, to the general public, that all went smoothly. While the following pages show the reverse to have been the case, they also testify to the special knowledge and ability displayed in remedying mischance, as well as to the exquisite fitness of the machinery and scientific apparatus employed. Up to the time of the British-Indian Submarine Telegraph Company being formed, the difficulties in the way of establishing direct communication with India were formidable; but they were not due to want of confidence in either material or men, and may indeed be traced directly to the money market, its fluctuations, and periods of depression. It is amusing now to look back upon the interviews and deputations, the correspondence, the arguments, and the suggestions, with which the efforts to accomplish this great work have been environed. The countenance and material support of the Government were believed to be necessary. A guarantee of interest, such as is given to the Indian railways and other undertakings on the ground of the public benefits they confer, could, it was thought, be fairly asked; and various Ministers for India were appealed to at different times by those confident that a cable could be laid successfully, and anxious that the work should be commenced. For it must be known that the general public is still averse to investing its money in a telegraphic cable, until that cable is laid. The world is indebted to the strong faith of a surprisingly small number of capitalists for the submarine communication it enjoys; and the vast sum needed for the making and laying of a long line like the British-Indian, made it seem expedient to endeavour to so launch the enterprise that the share-taking public would regard it with the favour all Indian investments command, when the significant words "Government guarantee" are attached to them. To this end the leading authorities in the telegraphic world approached successive Secretaries of State again and again; the Directors of the Telegraph Construction and Maintenance Company, by the persistency with which they made proposals to the Crown, acting fully up to the purpose for which their Company was formed, that of "making and maintaining telegraphic lines of communication, both submarine and on land, in every part of the world."

In December 1866, definite proposals were made by the Telegraph Construction and Maintenance Board to the present Marquess of Salisbury, then Lord Cranborne, as Secretary of State for India, in which, after recounting the concessions obtained for the second direct line between Malta and Alexandria (since laid, and now working), an offer was submitted to his lordship by Mr William Shuter, the Secretary to the Company, an abstract of whose letter will be found in Appendix No. V.

Estimates were furnished of the working expenses of the proposed line, and of the mode in which the Government guarantee would be secured, which need not be quoted; for in the same month of December 1866, Mr Herman Merivale replied from the India Office in a letter from which the following is an extract :—

> Lord Cranborne fully appreciates and readily admits both the general importance of the scheme, and its special bearing upon Indian interests.
>
> But at the present time it is not open to him to apply the revenues of India to the promotion of such an undertaking, mainly in consequence of the representations of her Majesty's Government. The Governments of other countries have recently, at considerable cost to themselves, assisted in the completion of the land-lines of communication between this country and India.
>
> They were induced to incur this cost in prospect of a traffic at present not more than sufficient to repay it; and the Secretary of State could not justifiably join in setting up a competition, which, for the time, would

have the effect of wholly frustrating the expectations they were led to entertain.

In July 1867, or in less than six months after the foregoing refusal, Captain Sherard Osborn, as Managing Director of the Telegraph Construction and Maintenance Company, wrote a letter to the Secretary to the Treasury, stating that a provisional contract had been signed for the manufacture and laying of a submarine cable to India. An independent Company had been formed and launched with an influential directorate, and a proposed capital of a million. This was the Anglo-Indian Telegraph Company limited; and the requests contained in Captain Osborn's letter to the Treasury have been more than justified within the last few months.

The Board of Directors of the Telegraph Construction and Maintenance Company, he wrote, relying on the spirit and liberal intentions expressed in their lordships' memorandum of January 1867, respectfully beg that the Admiralty may be moved to obtain, as expeditiously as possible (in October and November next), accurate deep-sea soundings and temperatures across the Indian Ocean, between Bombay and the Kooria Mooria Islands, and on another line from the Kooria Mooria Islands to Aden, on the route which we propose to lay the cable.

Only three deep soundings and temperatures have as yet been obtained between Bombay and Kooria Mooria.

and that some ten years ago by Captain Pullen of the Royal Navy.

Those are of a most assuring and satisfactory character; but it will be necessary to verify them and add to their number.

We would suggest, that the man-of-war employed for this important national purpose be subsequently prepared to act as a guide for our cable-laying vessels in their course across the Indian Ocean and up the Red Sea, in the same manner as the Terrible lately assisted the Great Eastern in the Atlantic expedition.

The Admiralty despatched a frigate to the Indian Ocean, and an excellent series of deep-sea soundings was obtained between Bombay and Aden. No new soundings were taken in the Red Sea; and, as may be seen on reference to the diary kept on board the s.s. Great Eastern, the s.s. Hibernia, the s.s. Chiltern, and the s.s. William Cory, while the British-Indian cable was being laid this year, or to the maps annexed to it, the depths of that sea have been found to vary occasionally from the figures returned on the Government chart. On consideration, it was not thought necessary to have a man-of-war to act as guide, and the ships chartered by the Telegraph Construction and Maintenance Company were found sufficient for all the purposes of the Expedition.

The Anglo-Indian Company failed in raising the capital required, and the enterprise was stopped for the time. Before this, another proposal had been made to the Government, by Mr Charles Stewart, since deceased, who was then Chairman of the Anglo-American Telegraph Company, as well as of the Anglo-Indian Company. The latter Company had also the following gentlemen on its Board, the whole of whom signed the important memorial quoted below:—

FRANCIS A. BEVAN, Esq., 54 Lombard Street. SIR DANIEL GOOCH, Bart., M.P., Clewer Park, Windsor. J. R. McCLEAN, Esq., C.E., Great George Street, Westminster.	Directors of the Anglo-American Telegraph Company.

JAMES ALLAN, Esq. (Managing Director of the Peninsular and Oriental Steam Navigation Company).
GEORGE ELLIOT, Esq., Great George Street, Westminster.
SIR FREDERICK HALLIDAY, K.C.B., late Lieutenant-Governor of Bengal.
GEORGE GARDEN NICOL, Esq. (Chairman of the Chartered Mercantile Bank of India, London, and China).
PHILIP RAWSON, Esq. (Deputy-Chairman Union Marine Insurance Company).
SIR MACDONALD STEPHENSON (Chairman of the Telegraph to India Company).

And its Engineers were—

SIR CHARLES BRIGHT, M.P., AND LATIMER CLARK, Esq.

Sir Stafford Northcote had succeeded Lord Cranborne as Secretary of State for India, and as a further attempt to obtain Government countenance and support, Mr Stewart wrote thus in August 1867, or a few weeks after the prospectus of the Anglo-Indian Telegraph Company had been issued, and when it was found that its shares were not taken up :—

Determined as the Directors are to carry out this important project (the Anglo-Indian Submarine Telegraph Line), they find themselves much hampered just at this crisis by the depressed state of public confidence in all joint-stock companies, a difficulty only to be met by financial sacrifices on their part, or by delay. To avoid these, and to insure harmonious working with the Indian Government, this Company deem it advisable to make the following proposals ; and trust that a department which has done so much for the development of railways and other public works in British India, will think that we show sufficient grounds for the system of Government guarantee being extended to the no less important public object of insuring a perfect and permanent communication by telegraph between Great Britain and India.

In the *first* place, we propose to take a lease from the Indian Government of the Persian Gulf cable for thirty years, guaranteeing its repair and maintenance, and paying to Government 5 per cent per annum on the original outlay of capital. Assuming it to be £450,000, our yearly payment would be £22,500.

We may state that the Imperial Treasury have found it to their interest to lease for some years their submarine cables in the Mediterranean to another Company, at the rate of 3¼ per cent on the original outlay.

In the *second* place, we propose to relieve the Government of the present payment of £36,000 a-year, which is payable to the old Red Sea Telegraph Company—a sum which will eventually be equivalent to a gross charge of more than 1¼ million pounds sterling on the public Exchequer.

The two sums of £22,500 and £36,000, equal together to an annual payment of £58,500, would be made a first charge on the net profits from the working of the lines.

In return for this, and as a means for raising the necessary capital quickly and without loss, we would ask the Indian Government to guarantee us 5 per cent per annum on the sum necessary to connect Bombay with Suez, say one million sterling, being a sum equal to £50,000 per annum, if the Indian Government should ever be called on to pay it.

The net annual profits to be derived from working the lines are estimated at . . .		£372,000
Deduct from this the two annual payments above mentioned .	£22,500	
	36,000	
		58,500
there is left a balance of . .		£313,500

which is about 30 per cent per annum on the capital required, so that the transaction is essentially sound from a commercial point of view. We should be willing, in case the Indian Government were called upon to pay us anything under their guarantee, to repay them out of the profits of subsequent years.

Our estimates of the returns from working the lines are based on what we believe to be the soundest data and far within the probable results when Australian and Chinese telegraphic traffic shall pass, as we propose, through British India to Europe.

The telegraph route we are about to carry out is the one recommended by the Report of the Select Committee of the British Parliament on our Indian communications in 1866, of which Mr. Crawford, M.P. for the City of London, was the Chairman; and it strictly follows the route frequented by our overland commerce, the mails, specie, and the recently-organised transport-service to and from India.

In return for a guaranteed dividend of 5 per cent per annum on a million sterling, we undertake the duty of maintaining not only the Red Sea lines but likewise the Persian Gulf cable; and that free of all expense, and, indeed, with a revenue of £22,500 to the Indian Exchequer.

Our project will give India two distinct and independent routes of telegraph to Europe instead of the present precarious and uncertain one. We avoid the risk of the telegraph to India being obstructed or tampered with, in the event of Great Britain being suddenly involved in a European war; and we shall no longer be dependent on Russians, Turks, and Persians, as at present, for the maintenance of our Eastern communications.

Our project would also relieve the Indian Government and the Imperial Exchequer of an annual payment to the old Red Sea Company amounting eventually to £1,440,000 sterling. It will hereafter relieve the Indian Government of their present heavy losses on the telegraph system in India, by making certain portions, which we propose to take over, highly remunerative, and by bringing through the Indian lines, *viâ* Rangoon and Calcutta, all the traffic of the important countries lying beyond Hindostan.

Lastly, we would point out that the necessity for two submarine cables from India is of a paramount importance; for, as the telegraphic communication at present exists, the probability of the Indian Government being called upon suddenly to lay another Persian Gulf cable is imminent; and from this contingency the proposed Red Sea cables would effect a probable saving of over a quarter of a million sterling.

The Directors of this Company are aware that the Persian Gulf cable is said to yield a profit to the Indian Government of about £60,000 per annum. Much of this profit is however shown, we believe, by credit taken for work done for official messages; and even if it were otherwise, they submit that it would be more satisfactory to Government to do the work well, and with certainty for the public, than to be making a profit whilst all the British mercantile community are complaining of the present telegraphic arrangements.

Accepting, however, the £60,000 as a realised profit made by the Indian Government, there is a charge against them at present of £36,000 for the interest paid on the old Red Sea cable; there is nothing placed by them to reserve fund for another cable; and the loss they have sustained of nearly half a million sterling on the other portions of their telegraphs, is not taken into consideration.

Looking at our proposal from an imperial point of view, it is as well to call your attention to the large amount of property in submarine cables in the Mediterranean belonging to her Majesty's Treasury.

The British Government made great sacrifices to meet the telegraph from India *viâ* the Red Sea, by insuring a good telegraphic connection between Italy, Malta, and Egypt. We shall become lessees of that line from the Treasury, and thus work for the benefit of her Majesty's Government on this side of Alexandria, as we propose to do so for the Indian Government from Suez to Bombay and Calcutta.

The proposal to relieve the Government of all responsibility in connection with the old and abortive Red Sea cable—in other words, to save the national Exchequer *more than a million and a quarter pounds sterling*—would, it was thought, be acceptable; while the precedent of leasing the Malta and Alexandria line—first to the private firm of Glass, Elliot, & Co., afterwards to the Company succeeding them—had worked so satisfactorily, that it was believed that the representatives of the Crown would be glad to hand over their lines on the terms offered. Both conclusions were erroneous; and in September 1867, Mr Herman Merivale wrote from the India Office again:—

> I am directed to state that it appears to Sir Stafford Northcote that there are strong reasons which render it expedient that the working of the Persian Gulf cable should be retained in the hands of the Indian Government; he is therefore unable to comply with your request in this respect.

I am further to observe, that, while Sir Stafford Northcote would view with satisfaction the establishment of fresh routes for telegraphic communication with India, he must decline to guarantee interest on the capital required for the Suez-Bombay or any other submarine line. The Indian Government is, however, ready to afford the Company which you represent facilities in the establishment of stations, &c., and would be prepared to send a portion of its messages by the new route provided the line were efficiently worked, and the tariff moderate. The Secretary of State would also be willing to enter into an arrangement with the Company, should they desire it, in respect to tariffs for messages by the respective routes.

Although the Directors both of the Anglo-Indian Telegraph Company and the Telegraph Construction and Maintenance Company were determined that a submarine cable should be laid sooner or later between Suez and Bombay, the refusal of co-operation by the Government, and the unwillingness of the public to take shares, made it impossible to proceed further with the enterprise at that time; and the next step was a proposition made to Sir Stafford Northcote, and bearing on the communication to and from the Home and Indian Governments, and Abyssinia during the war.

Between Massowah Bay, Aden, and India, unless a telegraphic communication be effected (wrote Capsels must be kept going and coming, at a cost which, if reduced to figures, would be startling. And without a telegraph, the question of supplies for the army, assistance in the event of reverses or the means of withdrawing the force rapidly—should the Ministry at home or the Government in India deem it necessary—will be, as every one must allow, uncertain, tardy, and costly.

This Company happens, from the following circumstances, to be in a position to assist her Majesty's Government in this matter.

Ever since we succeeded in submerging the Atlantic Telegraph cables, measures have been slowly but steadily taken by this Company to bring about, sooner or later, as expeditious and safe a means of telegraphing to India from London as we have to the United States of America; to lay, in short, a cable from Suez to Bombay.

With this view, machinery and materials to a very large amount have been prepared by the Telegraph Construction Company; and but for the great financial and commercial depression of the last year, this important public undertaking would have been carried out at once.

We think, however, that the wants of her Majesty's Government may be worked in with the terms of the enterprise above alluded to; and I am authorised to say that this Company will undertake to make and lay a cable from Suez to Massowah, for about £300,000 sterling, within four months, if the order be given by the 1st of December; and that when the Government shall have no further need of the cable from the expedition being withdrawn, we will undertake, in combination with a company of satisfactory credit and position, to lease the said cable from Government on fair and equiview to continuing it as a submarine telegraphic communication to Bombay.

By this means we would point out to her Majesty's Government that a certain amount of the expenditure being incurred for the Abyssinian expedition might be considered as covered by a guaranteed interest, and her Majesty's Treasury would have their present property in submarine cables in the Mediterranean much improved.

So much time has been lost, that we are not prepared to make any offer for connecting Bombay with Aden before the next stormy monsoon, but should the rains in May next set in before the British forces are withdrawn from Abyssinia, we feel certain that the safety of the army will much depend upon such a telegraphic communication being speedily established; and I see no reason to doubt that the Bombay section would be laid by private enterprise in October next, if her Majesty's Government accept the proposition for the Red Sea section which I have now the honour to submit to your favourable consideration.

In the reply to this proposal, it was stated that Sir Stafford Northcote

Is not disposed to enter into any arrangement for laying a cable down the Red Sea, at the cost of the Government, with a view to ultimate extension to Bombay; but that in the event of the Telegraph Construction and Maintenance Company themselves undertaking the construction of such a line at their own risk, Her Majesty's Government will be prepared to enter into an arrangement with them for its temporary diversion to Massowah, or some other suitable point, during the continuance of the military operations in Abyssinia.

Then came further correspondence between the Telegraph Construction and Maintenance Company and the India Office, also on the conditions under which submarine telegraphic communication could be established with Abyssinia, but nothing came of it; and in April 1868 one of the most important and influentially-signed memorials* ever issued from the city of London was presented to Sir Stafford Northcote from various commercial authorities connected with India.

No satisfactory reply came to this memorial, and a strong reaction set in when its presentation was seen to be fruitless. There had always been a small body of capitalists interested in the establishment of a satisfactory telegraphic communication with India, who were averse to accepting any guarantee from the Government, and the number of these increased. It became mortifying, too, that proposal after proposal should be made without effect, when, as was believed, the Crown would be among the greatest gainers by the change. In 1869 it was determined, therefore, to again endeavour to raise the necessary capital, but not to appeal for assistance or guarantee from the Government. Although the Anglo-Indian Telegraph Company had never been formally dissolved, a perfectly new association was formed under the title of the British-Indian Submarine Telegraph Company, and nearly £400,000 of its capital was subscribed by about a dozen of its chief promoters before a prospectus was put forth. The Telegraph Construction and Maintenance Company undertook to manufacture and lay the line upon terms which gave them a large portion of the pecuniary responsibility. Mr John Pender, a merchant, who, acting in conjunction with Mr (now Sir Richard) Glass, Mr George Elliot, M.P., Sir Daniel Gooch, Bart., M.P., and others, was largely instrumental in converting the well-known business of Glass, Elliot, & Co. into the Telegraph Construction and Maintenance Company, of which he was first Chairman, and to which the world owes electrical communication between England and America, and now between England and the far East;—Mr John Pender made the task of raising the capital comparatively easy by the largeness of the sum for which he gave his personal guarantee, and by inducing other capitalists to follow his example. Men and firms put five figures after their names without hesitation; and the

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* See Appendix No. IV.

Company was launched with Mr Pender as its Chairman and the following Board:—

SIR JAMES ANDERSON.
BARON EMILE D'ERLANGER.
LIEUT.-COLONEL GLOVER, R.E., late Director-General of Telegraphs in India.
LORD WILLIAM HAY, Chairman Anglo-Mediterranean Telegraph Company Limited.
THOMAS DYSON HORNBY, Esq., Director British and Irish Magnetic Telegraph Company.
PHILIP RAWSON, Esq.
SIR CHARLES WINGFIELD, K.C.S.I., M.P., late Chief Commissioner of Oude.

The Engineers to the Company were—
LATIMER CLARK, Esq.
HENRY CHARLES FORDE, Esq.

Two of the Directors of the expiring Anglo-Indian Telegraph Company, Mr George Elliot, M.P., of the late firm of Glass, Elliot, & Co., and a director of some of the chief submarine lines of the world; and Mr J. R. McClean, C.E., M.P., the then Chairman of the Anglo-American Telegraph Company, chanced to be in Egypt when the British-Indian Company was launched, or they would have doubtless consented to join its Board. Mr Elliot was unconsciously rendering useful service to the new Company at this very time; for, when at Alexandria, and with the view of facilitating the establishment of submarine electrical communication with India, he despatched a competent engineer to test the portion of the old Red Sea cable, which had been lying useless in the Gulf of Suez, between Suez and the island of Jubal, for the last ten years, and the condition of which would, he knew, bear strongly on the vexed question of the life of cables laid in waters having coral bottoms and reefs. This length of cable was found to be perfect. Messages were sent through it with the greatest ease; and the coral, which is known to have grown over and about it, has acted as its protection instead of its bane. This discovery made it additionally clear that a cable properly made and laid, need cause no more anxiety to its owners when lying in the Red Sea than in other waters, and effectually disposed of many startling theories.

So much of the capital had been subscribed that there was no difficulty in raising the remainder. No favours were asked, and not a single penny was paid for "financing." The Telegraph Construction and Maintenance Company had, with prudent faith, been all along preparing for the work which had now to be performed. Thus it was that, thanks to the plant and material ready to their hand, its Directors were able to promise that the line should be complete and working within fifteen months of the time at which the

H. Adlard sc.

SIR DANIEL GOOCH, BART. M.P. C.E.

Chairman of the Telegraph Construction & Maintenance Company.

order for it was received. This Company contracted to make and lay the cable for £1,000,000; and to take no less than £460,000 of that sum in paid-up shares of the British-Indian Company; and the agreement made in January 1869 that the cable should be laid by April 1870 has been, as the following pages show, strictly carried out.

It is amusing, when reading of the banquet given by the Telegraph Construction Company in October 1869 to celebrate the completion of the manufacture of the British-Indian cable and the approaching departure of the Great Eastern, to remark the tone of the speakers. The proposals made to various Secretaries of State, the memorials from the city of London and from the communities of Bombay and Calcutta to the Government, the thesis that an affair of such grave moment should be treated as an important imperial question, seemed forgotten, and every one rejoiced publicly that the cable about to be laid would be free from the incubus and trammels inseparable, they said, from Government help.

Sir Daniel Gooch, Bart., M.P., the Chairman of the Telegraph Construction and Maintenance Company, presided, and about 180 gentlemen sat down to dinner, among whom were Lord

Houghton, Lord W. Hay, Mr Massey, Captain Sherard Osborn, Mr J. Pender, Mr R. W. Crawford, M.P., Mr G. Elliot, M.P., Dr W. H. Russell, Captain B. Seymour, Mr Verdon, Sir C. Bright, and Sir F. Halliday.

Lord Houghton, in returning thanks for the House of Lords, said it was generous in them to drink this toast, seeing they were not indebted either to the Houses of Parliament or to the Government for any assistance in their great enterprise; though he dared say, when individual enterprise had done its best and been successful, Government might step in and take the telegraph out of their hands, as it had the telegraphs in this country.

Mr Crawford, in returning thanks for the House of Commons, said it was a happy thing that Parliament had nothing to do, directly, with the enterprise. The report of a House of Commons' Committee* of which he was a member, led, however, to its being undertaken. Endeavours had been made to induce the Indian Government to take the matter up when the public were not alive to the merits of the case; but those interested had become wiser. When the Falmouth-

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* The course of the British-Indian cable, as seen on the map at p. 166, accords with the recommendations of this Committee.

Malta cable was laid, there would be an unbroken system of telegraphic communication with India, unattended with those vexatious delays with which they had been so long familiar.

Mr Massey said he had to announce to them that arrangements in which he had been permitted to take a part had been completed for the laying of a cable from Ceylon to Singapore, with a view to the extension to the great ports and outlets of China.

Mr Verdon said he was sorry that China would receive the advantage of telegraphic communication before Australia, He believed they would never rest in Australia till they had the advantage of telegraphic communication with this country.

Sir Daniel Gooch proposed prosperity to the British-Indian Expedition.

Mr John Pender, Chairman of the British-Indian Telegraph Company, responded to the toast, saying he had looked forward with considerable anxiety for many years to the present day, and they could conceive the gratification he felt that the enterprise he had so long promoted was about to be carried out. He referred to the difficulty there had been in inducing the public to find capital for the work, and expressed his gratification that the Company he represented stood in an independent position towards the Government.

This banquet was the last of the preliminary stages connected with the enterprise. It must now be told how the practical work of that enterprise was performed.

THE GREAT EASTERN'S VOYAGE TO BOMBAY.

The Great Eastern steamship left Portland on the 6th November 1869, on her way to Bombay, carrying once more the precious freight of a deep-sea cable, and fitted with all appliances for submerging it. Her tanks contained 2375 nautical miles, and her companion ships, the Hibernia, Chiltern, and Hawk, were to carry among them 1225 miles more, making a total of 3600 nautical, or about 4050 statute miles. This length was to suffice for the communication between Bombay and Suez by way of Aden, and for joining the Malta and Alexandria line. Another cable is now being laid from Falmouth to Gibraltar and Malta, and its completion will unite Bombay and the British fortresses in the Mediterranean along one line of submarine telegraphy which will be unbroken except at Suez.

The length of the Bombay and Suez cable chanced to be precisely the same as that of the French Atlantic between Brest and Duxbury; and, excepting for the liberal use of ground flint or silica, as a protection against the ravages of the teredo, its coverings were also similar. The teredo attacks hemp with great readiness; and in a cable recently raised that had been lying for some years between Toulon and Algiers, it was found to have reached, and to have slightly injured, the gutta-percha of the core. Like the French Atlantic, the cable just laid had extra coverings for a great distance from the shore. Experience has shown that motion on the bottom of the sea extends to a much greater depth than was at one time believed; and therefore, in addition to the ordinary massive shore end, it is now the practice to have many miles of an intermediate character before the comparatively weak deep-sea section commences. An account of these various sections, and of the mode in which they are manufactured, may not be uninteresting.

The central and essential portion of the cable, the conductor, consists of a strand of seven copper wires, six of which are wound in long spiral coils around a central one. In the section between Bombay and Aden these wires are one-fourth heavier than between Aden and Suez; but in both sections they are quite fine and slender, weighing at most only 180 lb. per nautical mile. The strand of wires is then covered with alternate layers of Chatterton's compound—a mixture of gutta-percha, indiarubber, and other gums—and of gutta-percha itself. The Chatterton's compound is first applied, and it flows into and fills the interstices between the wires. In the Bombay and Aden section four layers of each kind are employed, in the Aden and Suez section three layers; and in both cases the conductor and these layers constitute together what is called the core of the cable. This core is a little more than a quarter of an inch in diameter, and it was sent in three-mile lengths from the gutta-percha works to the factory at Greenwich for completion. Each three-mile length was wound upon a huge bobbin, and on arrival at Greenwich was put into a tank under water and tested electrically after some hours of submersion. When its condition was proved to be satisfactory it tion of cutch or other mixture, and being, in fact, a protective padding between the core and its outer coverings. This jute-yarn was applied by a machine consisting of several bobbins revolving around a tubular axis through which the core passed, so that it was clothed as it went on its way. It is important as regards electric condition that the cable should be always wet. The core on its bobbin retains enough moisture by cohesion to fulfil this requirement, the jute-yarn itself is wet, and the clothed core passes immediately into a tank containing water. Up to this point, except for the slight difference of thickness already mentioned, the whole of the cable is alike; but afterwards its treatment varied with its destination. The greatest length, or the 1874 miles of deep-sea cable between Bombay and Aden, required the least protection. It is covered by nine strands of wire and hemp, each strand composed of a galvanised homogeneous iron wire, rather less than one-tenth of an inch in diameter, and surrounded by five yarns of Russian or Manilla hemp. Each strand is first passed through a mixture of pitch, tar, and ground flint, and the whole cable again through a similar mixture. Lastly, a strand or strands of yarn is wound spirally round it; it is again passed through the mixture, and so into a tank to be ready for shipment. The effect of winding the yarn around the covering wires is that these are not in contact, but separated from each other by about their own diameter. The section next in length consists of 1205 miles for the deeper portion of the Red Sea, and this is more strongly protected. Its covering consists of twelve galvanised iron wires, without hemp, each about the sixth of an inch in diameter, and wound on spirally so as to be in absolute contact. Above this there are strands of jute-yarn, laid on in two servings in opposite directions, and covered with one covering of Latimer Clark's compound—that is, of ground flint and mineral pitch.

The shore end at Bombay had for ten miles the additional protection of twelve strands of galvanised iron wire, each strand consisting of three wires of one-fifth of an inch in diameter. For eighty-six miles further it is covered by ten single wires, each a quarter of an inch in diameter; and for fifty miles more by twelve wires, each one-fifth of an inch in diameter. Approaching Aden, the shore end has twenty miles like the last-described portion, and then ten miles covered with the strands of triple wire. In the Red Sea, both at Aden and Suez, there are ten miles with triple strands, and at the Aden extremity three hundred and twenty-five miles, covered with ten wires of one-fifth of an inch, before the deep-sea portion is reached. In all the portions the strands, or single wires, are wound on spirally; and in all, excepting each ten miles of shore end, the wires are covered externally by yarn, and this by a coating of Latimer Clark's compound.

The Great Eastern left England carrying 5512 tons of cable, 3824 tons of fuel, 6499 tons of coal, and apparatus and appliances, making up a freight of 21,000 tons in weight, and a venture of, including the ship, some two millions sterling in value. A head-wind was blowing strongly at the time, but the voyage was commenced at the rate of seven knots per hour. She sighted Madeira at nine o'clock on the night of the 13th, and cast anchor at St Vincent at noon on the 19th instant. Remaining there for six days, she continued her voyage on the 25th. From St Vincent to the Cape she experienced head-winds the whole way, arriving at Cape Town on the morning of the 22d December. The voyage to the Cape was not an eventful one, and the anxieties expressed at home, though natural—for the rate of insurance had been high, and the great ship had left England with her heavy and valuable freight at a stormy season of the year—occasioned great surprise to all on board when heard of subsequently. The mail went out the day before the Great Eastern arrived at Cape Town, hence the delay in the news of her reaching England. At ten in the morning of the 7th November, the great ship spoke, in lat. 48.°26′ N., and long. 5.° 27′ W., the steamer Atalanta, bound eastward. On the next day she exchanged signals with s.s. Marathon, steering to the northward. On the 9th she sighted the brig Thompson of Workington, from Belfast to Plymouth. The latter vessel had been blown to the southward, and was in distress, having in the gale lost her foremast and figure-head. The Great Eastern made for her, but the brig, though making water fast, replied that she required no assistance. On the 29th a very large waterspout was seen close to the vessel; and on the 30th she exchanged signals with the French bark Nouvelle Albatross, bound from Marseilles to the coast of Guinea. In the Bight of Benin she experienced a considerable amount of current; and on the 6th of December a good deal of lightning was seen. Off the mouth of the River Congo—which was some three hundred miles distant — the water was much discoloured, and the sea was of a dirty green. The Great Eastern departed from the usual course to insure a smooth-water passage, and ran into the Gulf of Guinea close to shore the whole way, and then down the west coast. At the Cape she took in 3000 tons of coal; and her captain and officers experienced, during her necessary stay there, an amount of thoughtful kindness and generous hospitality which makes them speak of the "people at the Cape" as of warm personal friends.

The Great Eastern left the Cape on 31st December in company with the Chiltern, a strong southerly breeze blowing; and she kept close in shore and rounded the Cape of Aquilas. New-Year's Day came in with a strong breeze from the S.E., and there was a very strong current against the ship. On the 2d there was still a strong breeze, with squally weather. The Great Eastern kept close to Cape Recife, and there parted company with the Chiltern, which went ahead. There was still a very strong current against the ship, and Captain Halpin resolved to leave the land, and cut across to the west coast of Madagascar. This proved a very fortunate change; for on running close up to the west coast, the current, formerly adverse, was found to be favourable, at the rate of, on some days, forty miles per diem, and the distance sailed increased from about one hundred to one hundred and ninety or two hundred and twenty miles a-day. Moderate weather was now experienced. On the 8th the Great Eastern exchanged signals with the British bark Dryden, which was standing to the westward. On the 11th she passed close to the island of Juan de Nova, and on the 13th passed one of the Mayotta Islands. On the 14th, at noon, she passed within half a mile of the island of Assumption, and at three o'clock on the same day passed the island of Aldabra. The course then taken was past the Seychelles and right across to Bombay. The average quantity of coals burned on the voyage was 200 tons per day.

How the time went during her necessary detention at Bombay — how the line was laid between that port and Aden, and from Aden to Suez—will now be told in the form of a diary, which was posted regularly by the writer, who went out to India last year by the P. and O. route for the express purpose of accompanying the expedition back to Egypt during the performance of its work.

THE DIARY

OF THE

BRITISH-INDIAN TELEGRAPH EXPEDITION

CHAPTER I.

THE WONDERS OF INDIA—PREPARATIONS AT BOMBAY—ARRIVAL OF THE GREAT EASTERN—HER GUESTS—CASTE—NATIVE IMPORTUNITY.

Byculla Club, Bombay, 26th January 1870.—Returned to Bombay after a tour in the interior of India, extending over nearly 5000 miles, in the course of which, thanks to the railways, I have run rapidly through the presidencies of Bombay and Bengal, as well as the north-west and central provinces. The trip has been both instructive and pleasurable; and if it were not that I feel it a duty to confine myself in this record to matters germane to the progress of the British-Indian Telegraph Expedition, I should be tempted to quote from my diary some of the marvels I have seen. To have stayed at such places as Allahabad, while a holy fair, consisting of many thousands of Hindoo pilgrims and fanatics, was being held on the Ganges' banks; at

Jubbulpore, where I saw the whole tribe of Thug stranglers employed at a Government school of industry, acquiring and practising useful mechanical arts; to have stood by the memorial well of Cawnpore and revived its ghastly memories; to have explored Lucknow, and to have read in every stone of its ruined presidency the dread story of the siege; to have stood awestruck by the exquisite Taj and mosque of Agra; to have gone over the famous palace, fort, and Jumma Musjid of Delhi, and to have passed under the Cashmere Gate while the story of its storming was told in idiomatic English by an old soldier at my side; to have floated by the crowded ghauts and temples of the sacred city of Benares; to have lingered over the public buildings and noble sites of Calcutta;—to have done all this is to have become acquainted with such a variety of places of surpassing interest as surely no tour in any other country in the world could furnish. I have been in telegraphic communication with Bombay all the time I have been away; and so arranged matters before I left that I should be informed of the arrival of the s.s. Chiltern or s.s. Great Eastern directly either occurred. There had been no news of these vessels up to the time of my return this morning. Letters from England tell me of a slight alteration in the programme of the expedition.* The Hibernia, I learn, has coals substituted for 350 miles of the cable she was to carry, so that she may go direct to Aden without touching anywhere; and that quantity of cable will be sent through the Suez Canal in the s.s. Hawk and the s.s. William Cory, and laid down the Gulf of Suez in February as far as the Dædalus Lighthouse. "Captain Briscoe and the Hawk will remain at the lighthouse ready to meet you," adds my correspondent, "and will bring you home through the Canal." So far good; I shall be glad to have an opportunity of inspecting the Suez Canal again, and of seeing which of the widely-varying prophecies I heard so confidently launched during the opening ceremonies are most likely of fulfilment. Moreover, any alteration which will hasten our return home sooner than we hoped is a boon to be grateful for.

This afternoon I went with Mr Cruikshank—the Telegraph Construction and Maintenance Company's agent, who has been for some weeks in Bombay making necessary arrangements in connection with the Expedition—to inspect the new cable landing-house that gentleman has had erected on the shores of Back Bay. The lines of the Bombay and Baroda Railway come to within a few paces of this building, bringing their soft rich freights from the cotton districts and tumbling them on the "Green" around, but conveying no passengers thither, and up to this time having no terminus. The cable-house is a serviceable little mansion, with Venetian blinds of teak, and a thickly-thatched roof to keep out the rays of the fierce sun. From its windows a fine view over the whole of Back Bay is obtained. Far away to the right is Malabar Point, with the house of the governor of Bombay just visible through the trees; while before us is the expanse of water along the bottom of which the shore end of the cable will be brought. There is a long white line of surf stretching from left to right, and marking the situation of one of the many ridges of ugly rocks with which the bay abounds, and which are visible at low water. Long sticks standing in the sea at regular intervals between where we are and the headland, on the other side of which the Great Eastern will lie before her final start from Bombay, tell, however, of the pathway of soft sand between the rocks which will form the bed for the shore end. Mr Cruikshank has had the bay sounded carefully, and the character of its bottom is well known. When the cable is landed, its end will be brought into this house and placed upon the testing-table,—a solid piece of masonry with a flat wooden top, and which resembles nothing so much as a huge sarcophagus. The extreme delicacy of the instruments employed makes a fixed table a necessity, and the one before us is built up of stone, and looks as if it would last as long as Bombay itself. Here the electricians will apply their tests, and from this little room will the crucial messages be sent to and received from Aden upon which the professional verdict will be given after the line is laid. Native labourers in their picturesque Oriental dresses and turbans were hard at work putting the finishing-touches to this house—some giving it a coating of blue paint, others busy with the thatch on its roof, and others again fixing its screws; for, with an eye to future cable expeditions, the entire structure has been made portable, and can be taken to pieces and shipped to China or Australia as easily as a box of child's bricks.

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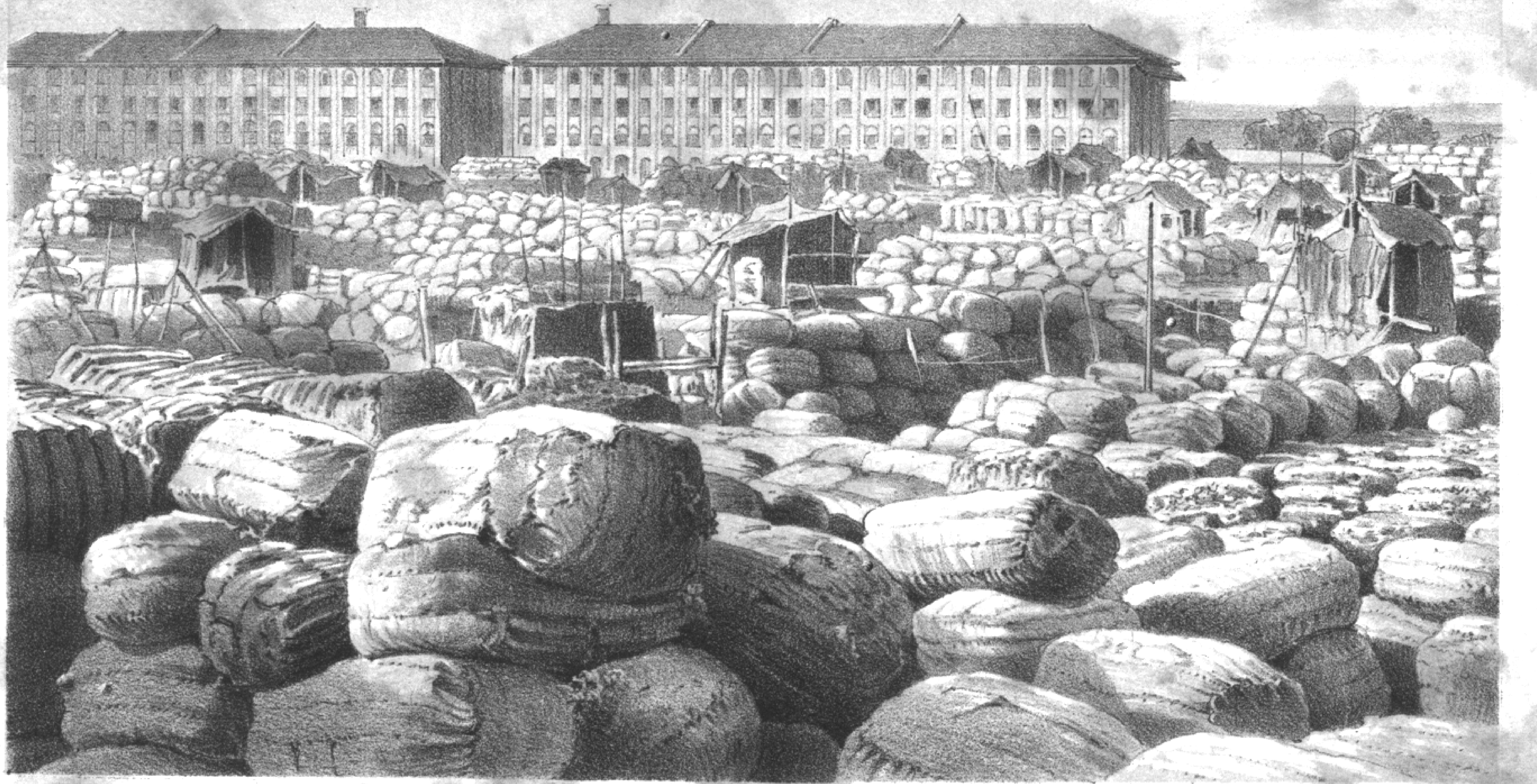
* For original programme, see Appendix No. III., p. 305.

"I'm not in the least surprised at the Great Eastern not being in," remarked Mr Cruikshank in the intervals of explaining and admiring "the best cable-house ever built, and containing one of the most solid pieces of masonry ever seen in Bombay" for a testing-table. "I did not expect her so soon as this, and don't think she'll be here for another ten days; but I confess I thought the

Chiltern would have been here a week since, and I look out for news of her now every day."

Half an hour afterwards we have crossed the Cotton Green, a large open space, on the borders of which the cable-house stands, and which is one mass of huge brown bundles piled together like rocks upon a beach, each full of fleecy cotton, which protrudes from odd corners and bursts from casual holes as if those same rocks were sprinkled with white surf. At the side of this strange place, which is a very wilderness of raw material, stands an imposing range of buildings, in one of which we find our friends the cable-layers and working engineers, who have come overland, and who are, like ourselves, waiting for the Great Eastern. It is while we are congratulating them on their comfortable quarters that one of their number rushes in with the welcome news that the Chiltern has been signalled, and is now coming in.

In a few minutes more, Mr Corke, the assistant master-attendant of Bombay harbour—a gentleman who is apparently brimful of energy and nautical enthusiasm—Mr Cruikshank, and myself, are being rowed rapidly across the harbour to the Chiltern, anxious for news from the Cape of the great ship. The Chiltern was taking up her posi-



M&N.Hanhart lith.

THE COTTON GREEN, BOMBAY.

tion about a mile from the pier, and alongside a vessel laden with coals for her benefit. Her commander, Captain Edington, soon gives us the welcome intelligence that he "left the Eastern off Algoa Bay on the 2d January—all well." The two vessels were together at the Cape, where the Chiltern had remained seventeen days, and they had also kept company as far as the point named. According to Captain Edington's calculations, six days at least must elapse before the great ship can arrive, and even this estimate is qualified, by reason of "the strong currents of the Mozambique Channel," down which her course lies, and which, adds Captain Edington, "may easily delay her four days more."

27*th January.*—The rumour this afternoon that the Great Eastern had been actually signalled, and was then making for the harbour, was so at variance with the information recorded yesterday, that many of those best qualified to form an opinion decline to believe it; Captain Edington good-humouredly asseverating that "unless the old ship had been making fun of the Chiltern all the time they were together, it was morally certain that the signalmen were in error, and had taken one of 'Bibby's four-masters' for the funnels of the great ship." This was at a council of engineers and electricians held in Mr Cruikshank's room at Palonjee's Hotel, at ten P.M., for it became dark soon after the news began to be proclaimed, and though a boat had been sent off by the authorities of the harbour, nothing had been heard of it up to that hour. A little later in the night, and Mr Cruikshank was on the deck of the Great Eastern, which was being kept out to sea till daylight, shaking hands with Captain Halpin, congratulating him on the rapidity with which he had got over the ground since the Chiltern left him, and again hearing the pleasant words, "all's well." A telegraphic message was sent at once to Captain Sherard Osborn, the managing director of the Telegraph Construction Company; and as the Government lines are in better order than usual just now, we hope the safe arrival of the Great Eastern will be in the home newspapers in a day or two.

28*th January.*—At half-past ten this morning, the crowd of Parsee merchants, Hindoo boatmen, Mussulman buggy-wallahs, and Englishmen of various degrees, in waiting on the Apollo pier, were gratified by seeing the Great Eastern glide slowly from behind the vessels anchored in the distance, and finally take up her position an hour later by the buoy in Bombay harbour, which marked her appointed anchorage some two miles from the shore. Here the monster can swing at ease in waters which are never shallower than forty feet even at the lowest of spring tides; and here she will take in food for her engines in the shape of coals to the extent of 8000 tons. I joined a party of engineers and electricians, and made for the Great Eastern at once. It was a long pull, that two miles between pier and ship, and occupied us an hour and forty minutes in a native boat and under a melting sun, for the eddies and currents of Bombay harbour are numerous and strong. Old seafaring men here point ruefully to the Government fort in course of erection in mid-water, and insist that it has already created many new currents, which have greatly circumscribed the anchorage for ships.

No! there is nothing like the Great Eastern in the world; no sight which preserves its freshness in the same way; no structure, no mechanical contrivance, no monument of successful labour, which continues to impress the visitor so forcibly, however experienced he may be. Numerous as are the voyages I have taken in her, and pleasantly familiar as are the great vessel's decks and saloons, I find myself holding breath as we draw under her bows; and then the beautiful proportions, and the vast and graceful sweep and lines, elicit the old encomiums and the old warmth. The coat of white paint given her at Heart's Content, after the French cable was laid, seems to have been renewed; and in fact, as we learn later, Captain Halpin had the ship whitewashed from stem to stern only three days ago. This was done for a purely practical purpose. White is, of course, a cooler colour than black, and coolness is a desideratum when electric cables have to be carried through low latitudes; so the Great Eastern has been once more made to look like a huge iceberg, or some mammoth hybrid of the seal kind, floating its mighty length, and dwarfing by comparison the handiwork of man.

This coat of whitewash made, it should be mentioned, an immediate difference of no less than eight degrees in the temperature of the cable-tanks.

A pair of grey carriage-horses taking their morning exercise composedly up and down one side of the deck, with a groom at their heads, was the first sight greeting us when we stepped on board, and it told the old story of the vast gulf other ship in the world. It is these simple matter-of-course incidents occurring naturally and frequently, which impress one most; and an absence of a few months from this ship's decks, with experiences meanwhile which have extended over some of the finest steam-vessels on the ocean, made her appear as wondrous as when I first set foot upon her deck. A pleasant meeting in Captain Halpin's cabin, when we learn how "the ship had insisted on stepping along during the last few weeks;" how the opposing currents of the Mozambique Channel, spoken of as certain to retard her, had been dexterously avoided, and how another and favourable current was found which had increased her speed some forty miles a-day. We learn, too, that the tests taken continuously have proved the electrical health of the cable to have been undeniably good, and that the passage has been prosperous but uneventful,—the courtesies and abundant hospitality received by the officers of the Great Eastern while at the Cape being gratefully referred to. The process of coaling commenced at once: the two ships, the Sydney Dacres and the Bates Family—the latter of 3000 tons register—took up their positions on each side early in the morning, and were discharging their grimy cargoes into the Great

Eastern's hold literally as soon as she dropped anchor. It is satisfactory to find that no time is to be lost, and that the expedition will commence its real work at the earliest possible day.

29*th January.*—The Chiltern has taken in her prescribed quantity of coals, and the Howden has joined the Sydney Dacres and the Bates Family, and is already assisting in the filling of the great ship. The public have been permitted to visit the Great Eastern, under certain conditions, to-day. It is difficult to say what would have been the effect had it been decided to refuse them altogether. All India has been on the *qui vive* for the Great Eastern's arrival, and the ship has divided with the Duke of Edinburgh the honour of being the chief text for speculation and comment for some weeks past. I found the interest taken in her to be as keen at Delhi and Agra as at Bombay and Calcutta; and when the newspapers published, as they have done to-day, full descriptions of the ship's wonders, the crowning stimulus was given to public curiosity, and the disappointment would have been keen and outspoken had permission to inspect her been refused. Fully anticipating, from his experience at the Cape and elsewhere, that the applications for permission to see over the ship would be exceedingly numerous; knowing, too, how impossible it would be to comply with many of these at the times asked,—Captain Halpin wisely determined to specify particular days upon which the sight-seers would be admitted by ticket, such tickets being procurable for a small fee at depots specified by public advertisement in the Bombay journals. The money derived from this source is to be divided among the ship's company on the Great Eastern's return to England, and will make a pleasant little bonus upon good behaviour.

The Anglo-Indian visitors—of whom there were surprisingly few to-day—who had drawn the same conclusion from Captain Halpin's advertisement as the gentleman who read it aloud in the breakfast-room of the Byculla Club this morning, must have been mightily surprised at the appearance of the ship this afternoon. That the fee of two rupees would be an effectual bar to the native sight-seer, and that the English community would have the Great Eastern to themselves on the first public day, was that Club reader's confident announcement. The advertisement stated that due notice would be given of days when the ship would be thrown open at lower rates, and these would, it was argued, be waited for by all but the "upper ten" of English Bombay. Those thinking so did but scant justice to the intelligent curiosity of the native mind. From an early hour the ship was beset by Parsees and Hindoos until, by four P.M., the strangers in European costume were in a large minority. The snowy robes and peculiar head-dresses of the Parsee were to be seen on all sides,—on the paddle-boxes, the bridge, the deck, down in the saloon, outside the tanks containing the cable, at the door of the testing-room (a sacred spot, to which no unauthorised person is admitted); and, clustered round the enormous red buoys, were the bright costumes and intelligent faces of Hindoos and Mohammedans; and though some of the English members of the services, with their wives and daughters, as well as officers from the ships of various nationalities lying in the harbour, were present, the people of the country were there in the proportion of ten to one. Still there has been no crowding; and when the population of Bombay (a million) is taken into account, it is certain that the interest taken in the Great Eastern is less demonstrative than might have been expected. Liverpool or Sheerness sends more sight-seers on board in a single morning than Bombay will furnish at the present rate during the whole time of the great ship's stay. Can this be apathy? or is it that the admission-charge has had the effect of keeping people away?

I had a small illustration to-day of the peculiar difficulties attending the employment of labour in India. I wished to hire a lithographic press, to take with me on the voyage to Aden. I saw one which answered my purpose exactly, and which was offered on moderate terms. Before engaging it, however, I asked if the owner could recommend me a trustworthy man and boy to work it; whereat I saw by the elevation of the lithographer's eyebrows, and the look of amused surprise which passed over his face, that I had been unconsciously guilty of an absurdity. "Would I step into the office and see one of the presses at work?" I did so, and found that before a sheet of the size of an ordinary letter could be struck off, a staff of four able-bodied men must be employed. I must take with me on board a lithographic writer (in vain I pleaded that I could write on lithographic paper myself; the other men could not work with me or under me, I was told, and the whole thing would be useless); secondly, a pressman; and, thirdly, two men for rolling the machine. I must be careful to select these people all of the same caste, and if any one of their number falls ill, or suffers from the sea to such an extent as to unfit him for work, I may count upon the rest remaining idle until their companion recovers; and, as if this were not enough, my informant added: "Besides, I don't think you'll be able to persuade them to go at all; they'd be afraid of being so far from home, and of losing their caste by crossing the sea." It is certain, therefore, that the advantages of lithography are not for me, and that I must fall back upon a Hindoo or Parsee amanuensis.

1st *February.*—Called with Captain Halpin upon Sir Seymour Fitzgerald, the Governor of Bombay, whom we found full of genial interest in the Expedition. "I have good reason to be gratified," said his Excellency pleasantly, on our introduction, "at the prospect of direct submarine telegraphic communication between Suez and Bombay; for it so happens that the very first despatch I wrote to the home Government, after taking my seat here, was to urge the necessity of such a line as the British-Indian Telegraph Company is now about to establish." It was not for us to express surprise at Sir Seymour Fitzgerald's views not being adopted; but it really seemed as if we had in these few words another illustration of the vast difference between governing at Whitehall and governing on the spot. One of the most ludicrous things to a stranger is the daily bulletin published in the Indian journals concerning the condition of the Government lines. These are so frequently out of order, that the extent of their incapacity forms a regular item of news, thus:—"Telegraph Line Reports, Kurachee, 5th December, 5 P.M.—Cable communication perfect to Fao; Turkish line interrupted beyond Semawali; Persian line interrupted beyond Shiraz." When I met the foregoing extract in the copy of the Bombay Gazette I saw at Aden on my way here, I could not understand it. Side by side with the paragraph giving the latest information concerning the condition of Archbishop Tait, who lay dangerously ill at Broadstairs, was another giving the most recent intelligence concerning the Government telegraph, exactly as if the latter were also a distinguished invalid, whose precarious condition caused the liveliest interest to the community. On asking to have these singular announcements explained, I was told that the illness of the Government telegraph was intermittent but chronic; in other words, that the lines were so frequently out of order as to make this daily advertisement a necessity; and that from the assassination of the operators in some of the wild districts through which the land-wires were carried, and from other causes, it was no uncommon thing for the telegraph to be beaten by the mail. "Only last voyage," added my friend Captain White of the P. and O. steamer Sumatra, "we were the first to announce the news of the death of the Earl of Derby. It was telegraphed to Suez the night before the Sumatra left, and thirteen days afterwards, when she reached Bombay, we found there had been something wrong with the Government lines all that time, and that nothing more was known than that the Earl was seriously ill." With such illustrations constantly before him, and with the knowledge that the Government is popularly held responsible for the inefficiency of the telegraphic communication with England, it is but natural that the head of affairs here should be anxious to have matters put on a more satisfactory basis. The other authorities, however, have not, as we know, shared the views of the Governor of Bombay; and thus it is that private enterprise is about to accomplish that which the State has failed in carrying out.

Sir Seymour Fitzgerald asks Captain Halpin further facilities for landing the shore end or otherwise, and regrets politely that Mr John Pender, the chairman of the British-Indian Company, has been prevented coming to India to hear with his own ears, and see with his own eyes, how great are the benefits his spirited enterprise, and that of those associated with him, are certain to confer. Some conversation concerning the day upon which his Excellency will visit the Great Eastern, and the time and place of landing the shore end, and we leave for the great ship.

"The largest vessel ever seen in Bombay," said an enthusiastic Parsee sight-seer on board, "used to be the Bates Family of Liverpool; and there she is alongside of the Great Eastern, looking like a jollyboat." The Chiltern is drawn up by the Great Eastern too; and the Bombay shore end is to be paid into her from the latter to-day. The trench between the testing-house by the landing-place of the cable, and the offices of the British-Indian Company, along which the mile of land-line will run, establishing communication between the two, was commenced last night, and will be finished this evening.

There has been great difficulty in getting the coolie coal-heavers to come from the shore at a sufficiently early hour; so it has been decided to keep them on board the Great Eastern, instead of dismissing them each evening. By this means the great work of coaling will begin henceforth at daybreak.

The offices of the British-Indian Company, Rampart Row, are well chosen, being in the very centre of the busiest portion of Bombay, close to a cluster of the chief banks, and within a short distance of Elphinstone Circle and the famous Cotton Green. They are, moreover, on the direct line between the city and the principal landing-places; and the imposing board just put up, with its inscription, "British-Indian Telegraph Company (Limited)," is the occasion of much congratulation among the passers-by. The only thing we are waiting for now is the completion of the Great Eastern's coaling; and if this can be made to reach a thousand tons per diem, it is quite possible that the shore end will be laid, the splice completed, and the Great Eastern start on her mission this day week.

2d February.—Mr H. C. Forde, the engineer of the British-Indian Telegraph Company, who landed in India a fortnight since, has returned from Nagpore; and after visiting the Great Eastern, and comparing his tests with those of Mr Laws, the electrician of the Telegraph Construction and

Maintenance Company, has pronounced the cable to be electrically perfect. The Chiltern finished taking in the shore end yesterday morning, and moved from the side of the Great Eastern to moorings some two miles nearer Colaba Point. The general public was excluded from the great ship yesterday, but a large private party of Parsee and Hindoo ladies and children visited her in the afternoon, making decks and saloon bright with colour. Their pink, red, white, and yellow silks, their elaborate gold ornaments and embroideries, as well as their profusion of nose-rings, bracelets, and heavy silver anklets, gave an unwonted aspect to the ship, and suggested a fancy-dress ball of great brilliance, or a rehearsal by daylight of some particularly gorgeous amateur theatricals. There are invitations for Captain Halpin, Mr Cruikshank, and myself to dinner at Government House on the 5th, and the Governor proposes to visit the Great Eastern on the afternoon of the same day.

4th February.—The mile of land-line was laid this morning at half-past three to a running accompaniment of shrieks and songs, such as roused the sleepers in the military tents close by, and made one of the aides-de-camp of General Sir Augustus Spencer remonstrate formally at his chief's slumbers being so rudely disturbed. There was really no help for it. The coolies were so delighted with the job, and so exulted in the fun of laying a large rope's end three feet deep in the earth, that they refused positively to restrain their feelings, and would only let off their excitement in the form of song. It was a strange scene. First the line was brought from the Great Eastern in a steam-barge, and at half-past four P.M. transferred at Apollo pier to a bullock-gharrie in waiting, the coolies aiding in pulling it in hand over hand, repeating, "Good are the cable-wallahs, great are their names; good are the cable-wallahs wah, wah! great are the cable-wallahs, wah!" and so forth *ad infinitum.*

The white-robed Parsees, Hindoos, and Mohammedans, who are always waiting in great numbers on the steps of the Apollo pier; the line of English carriages drawn up that their fair occupants may inhale the afternoon's sea breeze; the crowd of loungers by the orchestra, where all Europeans are dressed *de rigueur*, and where to speak to ladies in a morning costume and eccentric hat, such as would pass muster very well at Brighton, is to seriously violate Bombay etiquette,—the people at all these popular meeting-places were roused into mild wonder. The bullock-gharrie was a common object enough. It was the dance and song of triumph of the brown figures at its side which made men ask "What those confounded niggers were up to now?" Uncoiling the cable from the gharrie and burying it in its appointed home commenced at half-past six P.M., and was not over until half-past three next morning; and as it was impossible to check either the "wah, wah," which is the native substitute for cheering, or the wild songs about cable-wallahs, during the whole of the interval between the hours named, it is not difficult to believe that the military gentlemen, who are camping on the ground through which the trench is cut, enjoyed a thoroughly bad night. Those whose curiosity led them to the doors of their tents, saw lines of natives, naked save for some linen wraps about the loins, waving lanterns, pushing, without purpose as it must have seemed, at a long rope, or busy with hands and feet pressing down the loose soil which eventually covered the line. Besides these were other figures in English dress, who might be discerned directing and encouraging; and hovering about all was a confused crowd of hand-lights—some crossing the Bombay and Baroda Railway, some running along the enclosed riding-ground known as the Rotten Row of Bombay, some burying themselves suddenly in the earth like glowworms with a turn for suicide. It must have made a strangely-incongruous picture viewed from a tent-door by a warrior roused suddenly from his sleep. Tests were taken soon after three A.M., and communication established between the cable-house and Rampart Row at once; and thus the first and smallest link in the great telegraphic chain between India and England was formed.

The interest taken by the people of Bombay in the Great Eastern and her errand takes other shapes besides that of visiting the ship. Among the public entertainments here, the minstrelsy of a Mr Dave Carson holds high place. This gentleman appears to combine in his own person the functions of low comedian and local satirist, and has acquired considerable reputation for his delineations of native character, making the Parsee laugh at his caricature of the Hindoo, while the Hindoo is convulsed at his clever skits on the Parsee. The great ship and the courtesy shown on board to visitors; the Indian Telegraph and the ridiculous side of the quick communication it will open out with home; the effect on Calcutta of this manifest addition to the importance of Bombay,—such are the jests this artist is putting into the mouths of the Baboos and Parsees he imitates; and the abundant laughter and applause prove how happily he has seized the topics foremost in the local mind.

The "Chief and Bahee Saheb of Jumkhundee"—I quote from a card of invitation—his wife, interpreter, and suite, came on board the Great Eastern to-day, agreeably to an arrangement made with Captain Halpin yesterday evening. The Bahee Saheb is a wealthy young Mahratta chieftain, who has been consistently loyal, and who entertains mixed parties of Englishmen and natives in European style. Last night, for example, I was present at a conjuring performance held in the chief's drawing-room and in a temporary theatre he had fitted up. An English "professor" had been engaged for the occasion, whose conjuring was mild enough, and who had nothing newer in his list of tricks than the decapitated head, with which Colonel Stodare stormed London some years since. But the audience formed a curious study, composed as it was of Brahmins of the highest caste, of members of the oldest and most aristocratic of the native families, of British officers in uniform, and civilians of various ranks. It was pretty, too, to see the chief's delight at being able to present the commander of the Great Eastern to his friends; pretty to see him take Halpin by the hand, and threading the crowd round him (still hand in hand like a pair of affectionate schoolboys), present him to friend after friend; and instructive to see the lively interest displayed the instant the honoured guest's position was known. On the Great Eastern to-day the electricians were astonished at the intelligent comprehension displayed by the Rajah's wife, who bears a high reputation for liberality and good sense, and who, by her chosen amusements and pursuits, and by inviting Hindoo and European ladies and gentlemen to meet on equal terms at her house, is doing her utmost to break down the barriers of prejudice and caste. This lady dresses as a native princess, with a large ornament in her nose; but as an accomplished equestrian, she uses the European saddle, and mingles with English ladies in the Bombay fashionable ride.

5th February.—Dined at Government House, Parell, a stately mansion in a well-wooded park, some three miles from Bombay. Sir Seymour Fitzgerald, some ladies of his family, and half-a-dozen gentlemen, his aides-de-camp, had paid their promised visit to the Great Eastern in the afternoon, bravely running the gauntlet of coal-dust, and returning on board the Governor's steam-yacht, piebald. Nothing could have been more unfortunate than the time of their visit, for the wind blew the fine black dust directly over the ship's deck, and to touch a handle, or to sit down on a chair, was to carry away a facsimile impression in black. The aides-de-camp in waiting were in undress uniform, and their white gloves were speedily in such a condition as to suggest the free use of a damp bill of the play; while the delicate green of the young ladies' dresses was so mingled with black before they left, as to suggest what I believe is called "a shot silk." How little the word "coaling" conveys to inexperienced ears, and how thoroughly it transforms a ship! It was remarked by all of us, when the Great Eastern arrived at Bombay, that she had never looked better, nor smarter, nor cleaner since our respective acquaintanceship with her commenced; and what is she now? A floating coal-hole. The rather obtrusive whiteness of her sides has given way to a dirty hue like the face of a miller who has been up a chimney. You cannot be on her deck five minutes without having the face and hands of a coal-heaver; and even the saloon and cabins and lower decks are so full of the fine dark powder, that it rises in eddies at the slightest provocation, and rests on walls and furniture as thickly as the dust of the road does on a Derby drag. While on board we seem to breathe, and eat, and dream coal. Barges and ships are discharging their black treasures at every available opening, and Captain Halpin has now put on the ship's crew to aid the coolies in their work. It was not practicable to do this before. Jack has well-defined ideas as to his own rights and privileges; and coaling is no part of the regular duty of an able-bodied seamen. At the Cape, however, the Great Eastern was coaled by her own men, for time pressed, and no natives can work with the same result as a disciplined crew; so the sailors turned-to with a will on the necessity for speed being explained to them, and with the best effect. It is proverbially unwise, however, to push a willing horse too far; and with the arduous voyage before us, it was at least as important to keep faith with the men by giving them their promised twenty-four hours on shore, as to start a day or two earlier with a disappointed and jaded crew. Accordingly, the coaling was left to the coolies until two days since, when the sailors, having returned punctually and in regular detachments from their few hours' leave, were set to work at the coals. I presume it is one of the effects of a larger number of hands being employed that the black clouds should increase in density, and the ship become fouler; but one could not help hoping that the maximum of filth was reached to-day. The officers on duty were like so many Ethiopian serenaders in blue and gold; and though the doors and windows of the cabin I am to occupy —a chamber with divans, tables, and chairs— have been kept closed ever since the coaling began, its interior is literally incrusted with black. However, without coal there can be no steam, and without steam the Great Eastern's task would remain unfinished, so that we may be perhaps allowed to regard the keen discomfort of the hours we spend on board as so much personal sacrifice to a great cause. One more point. It has been stated that silica and mineral pitch have been used for the outer coating of the British-Indian cable instead of the vegetable tar applied to the exterior of the first Atlantic line, the object being to provide something the destructive and voracious teredo would dislike. This mineral tar sends forth an odour, whenever fresh water is put into the tanks, which can only be compared to the divers sweet savours of the city of Cologne, or the interior of one of the glass closets in the school of pharmaceutical chemists in Bloomsbury Square, while some particularly foul-smelling experiment is carried on. These fumes are sulphureous in character, and pervaded the whole ship to-day.

CHAPTER II.

THE SHIPPING AT BOMBAY—THE FINANCIAL CRISIS—A TROPICAL SCENE—LAYING THE SHORE END.

7th February.—The Bombay shore end of the cable was laid successfully this morning from s.s. Chiltern. The work was to begin soon after daylight, so I joined the Great Eastern over night, slept in the now usual atmosphere of coal-dust, and was called and on deck by six A.M. The heavy night-dews of India, which wetted us to the skin when the land-line was laid, had drenched the Great Eastern, and now mingled with the grime as well as with the sulphureous exhalations from the tanks, so that wherever we stood or walked we were on a greasy surface—much as if the good ship had been rubbed down with dirty pomatum. This only, until the matutinal washing and scrubbing began. For, though no one would suspect it, decks are apparently washed and sailors busy with brooms and mops as regularly as if the Great Eastern were at sea. The whole place is dirty as ever half an hour afterwards, but this morning's experience teaches me that the ship is comparatively clean for a few minutes once in every twenty-four hours, and visitors who complain of dirt may be reminded grimly that had they come earlier they might have escaped it. The dew clings to bulwarks and machinery, stands in great drops on ropes and rigging, and tempts the Captain's noble English mastiff, Harold, into queer rolls and gambols. So wet is it in places that he apparently regards his gymnastics as a bath.

The morning is lovely. The sun has not gained the fierceness which will make us shrink beneath awnings later in the day, and there is a brisk freshness, a crisp vitality about the atmosphere which suggests active exercise, and makes one long for a good four-miles-an-hour walk on a country road. The ghauts or island-mountains which form one side of Bombay harbour stand out so clearly that the shape of the lofty palm-trees with which they are covered can be traced at a distance of three miles, while their undulating summits form a sharp line against the bright sky, and the slender strip of yellow sand forming a thin coast-line, looks like a tasteful ornament—a trimming supplied designedly by nature to make her picture complete. The sea is calm, but not perfectly smooth. Short ripples eddy and curl over its surface, and the sunshine makes even the pale Nile-like brown of the muddy waters of the harbour beautiful. The Great Eastern is, out of deference to her draught, so far outside the rest of the shipping, that there is on one side nothing but water between her and the hills, which close in the harbour like an artificial scene; while on the other, every vessel in Bombay is seen stretched in a mighty line, and as if arranged expressly to show how vast are the capabilities of the port. There they lay, motionless and at peace, after heaven knows how much tossing and anxiety, with their lofty spars and rigging intermingling so as to form innumerable mathematical problems in the morning sun,—a mighty fleet at rest. There could not have been less than three miles of shipping in front of the houses of Bombay, and they looked as if ranged on parade for inspection by their general the Great Eastern. A white mist hangs over the spires, mansions, and cotton warehouses of the city beyond, but as this rises, the latter resumes the air of thriving prosperity which, in spite of the commercial and official wailings to be heard on every side, is the prominent characteristic of Bombay. "No one has any money; there is but little business stirring. Ah, sir, you should have seen us in 1864!" is the kind of remark a stranger meets with who comments on the many practical evidences of mercantile and municipal activity to be met with here. It pleases Bombay to be wearing financial mourning. Quite a relishing emphasis is sometimes laid upon the over-speculation which preceded the panic, and the collapse from which Bombay has not yet rallied; but it seems all the time to an outsider as if the city were not unwilling to prolong its regrets, even after their cause has been removed or modified. It is not an uncommon case. The first anguish over, the mourning is made with an eye to fashion, and the enjoyments and conveniences of life are as much appreciated as ever. At the same time the dignity attached to suffering is not to be lightly given up; and to compliment Bombay on its prosperous air—to point to its many new buildings, its new market, its new streets, as leading up to comfortable convictions concerning its present wealth—is to wound its susceptibilities deeply. You are told at once of public works suspended or given up; and though he would be a bold man who advanced any argument against the great commercial future of the port — a future in which many residents insist Bombay is to swallow up the trade of other Indian cities — you run counter to the prevailing tone if you do not speak of its present deprecatingly, as of a friend who has, like Dogberry, had losses, and who is consequently entitled to sympathy as well as admiration. But prosperity is what its appearance suggests most strongly this morning.

When the steam-launch, the Electric, returns to the Great Eastern after conveying the first detachment of engineers and cable hands on board the Chiltern, the rest of us are taken over in due course. The latter vessel lies off the Dolphin light, about two miles from the great ship; and Captain Pryce, the master-attendant of Bombay harbour, Mr Corke, the first assistant, and two experienced pilots, have been on board her since six A.M. Captain Halpin, Mr Cruikshank, Mr Laws, the chief of the electrical staff, and Mr London, the chief (under Captain Halpin) of the cable-laying engineers, as well as forty and odd cable hands, make up the forces which join Captain Edington and the Chiltern's crew from the Great Eastern. The Chiltern's steam is up, and she proceeds round Colaba Point to the scene of operations. Bombay harbour, it must be remembered, is several miles in length; and the part of the city still called the Fort, though most of its fortifications have disappeared, forming one side of it, is a narrow strip of land running a mile or two into the sea, and terminating at Colaba Point. On the other side of this strip of land, and parallel with the harbour, is Back Bay, having Malabar Point as its other extremity, and the Indian Ocean for its waters. Thus, when the Chiltern rounded Colaba Point, the buoy-flags marking the course of the cable were seen at once, as well as the barge lent by the Government, and to which the shore half of the shore end was to be transferred. Following these flags with the eye, the cable-house could just be discerned on the distant shore. A Government steam-tug was also lying at anchor within Malabar Point, under the command of Lieutenant Brebner; and directly the Chiltern dropped anchor at ten A.M., the barge was towed alongside, and the paying cable into it began. The Chiltern was now in six fathoms of water, with Government House and Malabar Point about a quarter of a mile distant on the north-east. Some two miles and a half of cable were to be paid into the barge, which, protected by an awning, and with a stout railing round its front deck, suggested a swan-hopping expedition, or, at the very least, a civic picnic up the river Thames. Cables are far more sensitive to heat than men, and to preserve this stout shore end from injury by the sun had been among the first cares of those about to lay it. The barge was admirably suited for its purpose, being of light draught, and of such a breadth as gave a fitting resting-place for the thick cable, the gradual paying-out of which from the fore-tank of the Chiltern to the deck of the barge occupied about three hours. The cable hands worked steadily to a spoken chorus of "Shove her along, push her through;" and the bulky coil itself behaved with great propriety, rattling over the pulley-wheels by the tank and down the wooden gutter or causeway put up for its accommodation, and leading towards the stern, without once kinking or otherwise misbehaving itself. When it left this causeway it was received by experienced hands, and was passed by them to the paying-out wheel at the Chiltern's stern. More experienced hands were waiting in the barge, and these coiled the heavy iron rope round and round the entire length of its deck.

The view from the Chiltern while this was going on was extremely beautiful, and, as will be gathered from the context, is never seen from ships, and rarely by any one. Close to us a natural mass of heavy black rocks rose up abruptly out of the sea—some jagged, others worn smooth by the action of the waves—some hurled together as if by an earthquake, others standing in regular order like fragments of Titanic masonry. Between these the rich chocolate-coloured soil threw up trees and shrubs of the brightest colour; and crowning both were the light walls and bright red roofs of the offices and outbuildings of the Governor's official residence. This combination of colours extends all round the bay. Sometimes the red or green or white predominates, sometimes the other hues, but all light up under the Indian sun, and the Bombay coast from this point of view is full of tropical beauty. The fury of the monsoons has blown some of the shrubs so completely in one direction that they seem to have been trained artificially; but the majority are stout cocoa-nut and toddy trees, and these rear their heads proudly skywards, as if conto tempest. Nothing gives such an Oriental character to a landscape as the graceful feathery palm. Here we have vast groves of them extending for miles in front of us, and forming a framework of dark green to structures and spires of white and red, and stretching down to the water's edge, as if anxious to meet and welcome the encroaching sea.

There is a long row of wooden piles to the left of the little cable-house, which look in the distance so precisely like the pier at Herne Bay that we ask their use, and find them to be some of the properties of the great Reclamation Scheme, and that it was designed to have converted all the water on the other side of them into land—a project which the financial crisis caused to be given up. To the left of these piles, —which, in spite of what we are told, continue to be in their dreary useless length so wonderfully like the mouldering structure they suggested first, that one looks instinctively through the glass for the Reculvers,—is a long line of native boats, with their white sails furled and their long masts bent like bows or fishing-rods; and beyond these again are factory-chimneys, and low bungalows with thatched roofs, the spires of English churches, cottages, the tents of the military, and the warehouses of the merchant. The harbour we have left is hidden by the long point we have steamed round, and not a ship is to be seen between us and the shore. The bay is far too rocky and dangerous for that; and it is seldom indeed that a vessel 275 feet long, and drawing 18 feet like the Chiltern, comes so far inland as we are now without paying for her rashness by destruction. Woe to the mariner who in bad weather mistakes Back Bay for the friendly harbour on the other side the point; the large wreck now lying broken-backed off Colaba indicates his certain fate: and though we hear of a solitary instance of an American vessel coming in here in error, and being rescued by the prompt aid and good seamanship of our friend Mr Corke, who is on the Chiltern's bridge, the story of her rescue is one of the traditions of the place, and the skilled sailor gives Back Bay as wide a berth as yonder fleet of homeward-bound vessels, sailing so grandly in the distance, takes care to do. We have ample time to learn these things, and to hear from old travellers how the grand coast before us resembles that of Ceylon, how yonder line of breakers denotes a more than ordinarily nasty patch of hidden rock, and how often these nearer ones have proved fatal,—while the cable is being handed out. A certain monotony follows upon good management in matters mechanical, and the absence of hitch or delay made this part of the proceedings unexciting.

Captain Halpin's assistant, Mr Moody, the navigating officer of the Great Eastern, now takes a boat, and follows the intended course of the cable between ship and shore, verifying, as an additional precaution, the soundings already taken, and measuring the exact distance between each. This he reports to be 2425 fathoms, so that the quantity of cable we have seen paid into the barge, 2535 fathoms, leaves a more than sufficient margin for slack and contingencies.

It was five minutes past two P.M. when those engaged in the actual laying of the shore end left the Chiltern, and proceeded slowly towards the landing, dropping the heavy cable on their way. It was quite an aquatic pageant. First the Government steam-tug, decked out with flags which flaunted in a gay line from every rope and spar capable of bearing them; next, the cable-bearing barge, towed by the former, and looking —with its awning fixed so as to form a sloping roof, and in its absence of masts and chimneys— exactly like a small Noah's ark; while sometimes alongside, sometimes ahead, and sometimes in the rear, were the steam-launch Electric, two boats full of cable hands, and Captain Pryce's official gig, pulled by active, quick-eyed, clean-shirted Chinamen, and with the master-attendant in solitary but imposing dignity at her stern.

The rest is soon told. The line was landed and carried into the testing-room of the hut; and though the hour was favourable, and the occasion not unimportant, two gentlemen, who chanced to be transacting business at the adjacent Cotton Green, and who came on to the cable-house, were the sole representatives of the English section of Bombay's million of inhabitants. To those who remembered the scene at Foilhummerum Bay on a similar occasion, and the ardent welcomes of the poor peasant fishermen, the contrast between Irish impulsiveness and Indian calm was very striking. We heard subsequently that as no formal invitations had been issued, the inhabitants of Bombay were necessarily ignorant of the hour at which the landing would be effected; and considerable disappointment was expressed that the whole operation, which occupied from nine A.M. to a quarter-past four P.M., should have been so hurried over as to preclude our many well-wishers from witnessing it.

At three P.M. the tug had advanced as near the shore as was safe, so she cast off the barge, and the steam-launch took it in tow, aided by one of the two boats which had hitherto followed. The other boat had rowed on ahead to the shore with a rope, the end of which was brought back through the surf and attached to the end of the cable. Then from all sides of the barge men dropped into the water, and, up to the waist, or deeper still according to their stature, ranged themselves on either side of the rope and cable, and dragged it ashore. From the shore it was hauled up to the cable-house, following a trench that had been cut for its reception. The length not required having been cut and properly sealed with gutta percha, under the superintendence of Mr Laws, the cable end was landed, and the chief work of the day was over. The line was then tested and pronounced perfect; after which, "success to the British-Indian Cable Company," and the healths of Mr John Pender, its chairman, and of Captain Halpin, were drunk. Immediately after this the whole party returned to the boats, and were pulled or steamed back to the Chiltern, which had remained at anchor where we left her, off Malabar Point. There everything was found ready for paying the rest of the shore end out seawards.

The cable had been passed through all the huge staples that direct its course from the fore-tank to the wheel at the stern; it had been passed under a wheel here, over a wheel there, which straightened and confined it, lest it should go out too rapidly; it had been passed three times round the drum, which controls the paying out, while a man stood ready at the wheel, a few rapid turns of which bring the gear to a complete stand-still should mishap threaten or arise. In the fore-tank were eight men, guiding each coil of the cable carefully, and seeing that no tangle arose down below; and men, a few feet apart, were stationed on deck between the tank and the stern, to watch every foot of the cable as it passed, and to give the alarm should anything go wrong. By means of the pneumatic compasses with which both the Chiltern and Great Eastern are fitted up, instructions as to the steering of the ship, and to the engine-room, can be conveyed instantaneously from the bridge. Moreover, the person superintending the paying out can, whenever it is necessary, communicate directly with the engine-room by the same means, when the engines are stopped and reversed long before the message could be conveyed in the ordinary manner. The turning of a handle in a certain direction compresses the air in a tube, causing a valve to act upon a spring, which causes a bell to ring, and attracts attention to the dial, when a cover flies up, disclosing the message "Full speed astern" or "Hard a-starboard" as the case requires. The Chiltern followed the course buoyed for her in the morning, paying out at about the rate of four miles an hour; and, at twenty-five minutes past six the last of her five miles was reached. The end of the cable was then sealed, and a chain attached. To the end of this chain was fastened an anchor, of the kind known as "a mushroom," and to the mushroom, by another chain, was attached a buoy. This arrangement at once marks the whereabouts of the cable, and prevents the strain from the buoy being felt by it, in the event of its coming on to blow. The buoy was dropped in 46 feet of water, at a point about two miles and a quarter from Malabar Hill; with Kennery light bearing S., 11° E.; and Colaba light, S., 42° E. Boats having again been made secure for towing, the Chiltern started on her return to the harbour, and anchored off the Dolphin shortly after nine o'clock.

CHAPTER III.

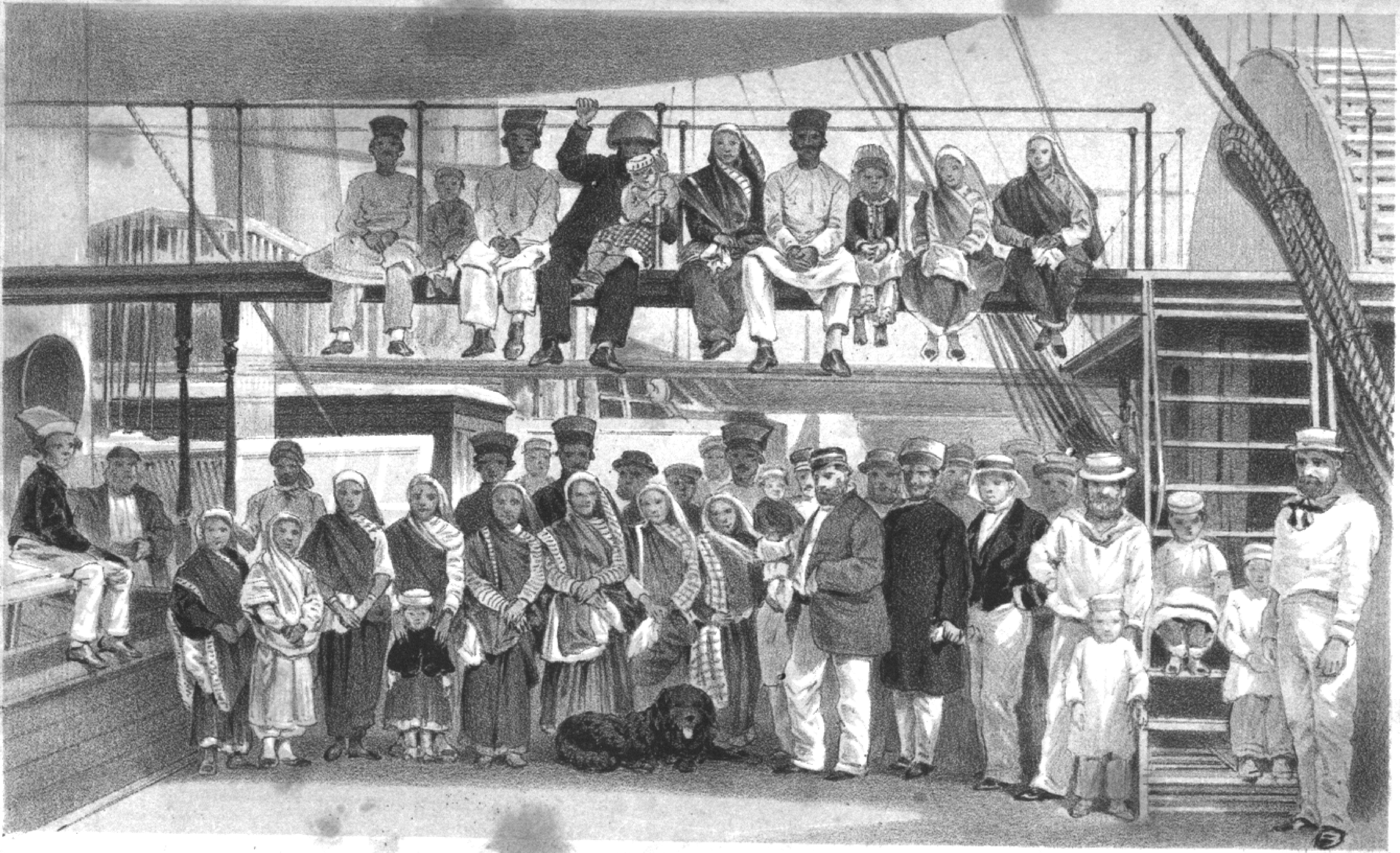
A DIGNIFIED RETAINER—NATIVE IMPORTUNITY—FESTIVITY ON BOARD THE GREAT EASTERN.

8th February.—Called on Mr Stacey, the Bombay manager of the telegraph line the Great Eastern is about to lay, and found, in spite of the chronic procrastination and torpidity which traders and workmen seem to labour under in the East, and which he had suffered from exceedingly, that he had succeeded in having his offices fitted up. These offices look far more business-like than when I visited them last, though it is perhaps to be regretted that they are on the first floor of the building, and that those who bring messages will have to mount a staircase before they reach the telegraph clerks. I made the acquaintance of the office doorkeeper or messenger to-day, a lofty swarthy creature in gorgeous new robes of bright Prussian blue and gold, with a massive turban, and a general air of barbaric splendour which was very impressive. He looked bright and gay even for the East, and is like nothing seen in Europe save in pictures or on the stage. In drawing a contrast between him and men in a similar position at home, say the bank beadles or the hall porter at the office where you insure your life, the conclusion was not favourable, in an artistic sense, to the liveried retainers of English commerce. Our friend here moved in his flowing robes like an Oriental potentate, to whom brilliant attire is a natural accessory, and who could not help appearing dignified and graceful in it. The obese servitors of London city, who look all stomach and buttons in their gaudy broadcloth and gold-lace, and who puff and waddle whenever compelled to leave their glass case or watch-box chair; and the other and lank variety—the "forked radishes" of liveried men who show as many angles as a clothes-horse—would all seem awkwardness incarnate by the side of this grave and gliding Oriental.

10*th February.*—Two days more of weary waiting, varied by the Bombay races, the brilliant ball given by the Byculla Club, and by explorations among the native bazaars and the magnificent new markets, during which the coaling of the Great Eastern goes on steadily, but with what seems terrible slowness to those eager to begin the work. The only other matter for record is the remarkable way in which the natives find reasons for presenting themselves at the companion-ladder upon days on which the Great Eastern is closed to strangers. They admit the general principle of closing to be excellent. They know, they say, as well as we do, that visiting is a hindrance to business, and they are fully satisfied that the process of coaling is neither pleasant to witness nor likely to be facilitated by their presence. But, in spite of all, they do so wish to come on board! They were ill on the appointed days. Their wife's mother was in the country. Their uncle's servant was burning his father's body. Their little boy was at the English school. Their infant daughter was being married. Their business engagements were of the most seriously perilous character. Their works of charity made it impossible for them to come without neglecting the most sacred of duties. So, for these or other equally urgent and important reasons, does not Captain Halpin, as a brave, a good, a noble topeewallah (Hat-man or Englishman) think an exception might be made in favour of this particular set of applicants, and to the determined exclusion of all native parties but their own? Their fertility of resource and their persistence are amazing;

and as, in spite of notices to the contrary, all comers have been generously admitted, the ship has been like a gaudy, fluttering, smut-bespeckled fair. Two of the leading native merchants of Bombay—names well known in England—asked in writing and obtained permission on special grounds to introduce "their families" on an off-day, and were kind enough to bring with them, the one three hundred and the other a hundred and fifty people of both sexes and of every age, from a funny little pale brown baby in arms, and with jewels on its tiny toes, upwards.

11*th February.*—About one hundred and fifty of the leading English people of Bombay were invited to luncheon to-day on board the Great Eastern. In the morning a party of Parsees, gentlemen and ladies, friends of Mr Soorabgee, the Parsee shipping-agent employed by the Telegraph Construction Company, and one of the most indefatigable and obliging of traders, presented that gentleman's card, and were shown over the ship. Their quaint and picturesque dresses lit up the coal-smeared deck surprisingly, and I persuaded them to give Mr Lindley, the photographer, who was on board by arrangement, a sitting. Soon after this, some Hindoos, also of both sexes, and presenting a distinct variety of ornamentation and costume, came on the ship, and after some hesitation consented to have their portraits taken in the same group as the Parsees. Just, however, as we were congratulating ourselves on the varied picture we should have, one of the latter beckoned me on one side mysteriously, and pointing an injurious forefinger at an elderly Hindoo lady with a face like crumpled leather, a mouth of the nut-cracker order of human architecture, and a huge ring through her pinched nose,—insinuated that her character was too light for it to be agreeable to him to be photographed in any group of which she formed one. It was quite in vain to reason with him. The highest social grounds were taken, and there was nothing for it but to apologise to the Hindoos, and to ask them to give their sitting afterwards. The photographer appeared from his dark chamber about this time, and announced the first group to be a failure by reason of the absurd rigidity of the sitters. My Parsee friends were put into position again, made to stand in natural little groups as if examining the ship, and besought quite earnestly not to wheel round to the instrument in a formal semicircle as they did before. Promising faithfully to keep as they were placed, they yet turned round shoulder to shoulder as if on parade at the critical moment, and with the result seen. Ano-



M & N, Hanhart lith

GROUP ON THE DECK OF THE "GREAT EASTERN" AT BOMBAY.

ther plate was then made ready and the Hindoos were brought together, when, in an unlucky moment, they discovered that one of the black firemen (a "Seedeeboy," of whom there are fifty on board) was at the water-tap behind them, and would possibly be included in the picture. The very idea was sacrilege. What! they, Hindoos of a high caste, be portrayed at the same time as a mere African labourer! The mere possibility of such a contingency was insulting; so, without more ado, they broke up and were down the ship's companion-ladder without heeding or answering the apologies and polite protestations made them on every side. Thus it is that the unlucky thirst of a Seedeeboy prevented my obtaining portraits of the Hindoos. The English guests began to assemble now, and there was no more time for photography. The two leading journals of Bombay, 'The Times of India' and the 'Bombay Gazette,' had full reports, headed "Tiffin on board the Great Eastern," one of which I shall now quote :—

> The tables were quite filled, and the saloon presented quite a festive appearance. Amongst the merchants present were the Honourable Mr A. H. Campbell and Mr Foggo; of the Royal Engineers were Colonels Ballard and J. J. Trevor; the railways had Mr Le Messurier

port authorities was Captain J. E. C. Pryce; while the P. and O. Company and Harbour Board had for spokesman Captain Henry, the popular superintendent. There were present also Mr G. A. Kittredge, the American Consul, and Mr J. Taylor, the secretary of the Chamber of Commerce. Every one knows the zest with which a company applies itself to an excellent tiffin on such an occasion, and we may pass over that pleasant part of the day's proceedings, and give some account of what was said after it.

The Chairman first called upon those present to drink a toast which was always received with enthusiasm wherever there was an assembly of Englishmen, "The Queen;" and seeing that one of her gracious Majesty's sons was about to visit this country, he thought there was considerable appropriateness in drinking not only to the Queen, but to the Queen and the Royal Family.

The toast having been duly honoured,

The Hon. Mr Campbell then said: When I reflect on the vicissitudes through which the laying of ocean telegraph lines has gone, I am at a loss for words to express my sense of gratification that we should now see the cable which is to connect the greatest of the dependencies of the English empire with England. Few of those present, I daresay, are really familiar with the history of ocean telegraphy. When I say that the vicissitudes of ocean telegraphy have been such as to damp the courage of many of the most enterprising men in England;—when I say that it is now fourteen years since the first ocean telegraph of any importance was contemplated, at a time when the Great Eastern certainly existed, but when it was little thought she would ever have part in a work of this kind;—when I reflect that the first cable was laid after an infinity of personal efforts and exertions on the part of those who had to raise the capital;—when I mention that it was really a work of house-to-house visitation, when sums of £500 to £1000 and even £10,000 were raised by private subscription with the view to laying a telegraph cable between England and America;—when I reflect that the Queen's Government granted the use of one of its most splendid vessels, the Agamemnon, and the American Government granted the use of an equally fine vessel, the Niagara—that the expedition set out with the greatest hopefulness but proved a total failure—that the earnest men connected with it again set to work, and after an increasing amount of labour in raising further capital and providing new mechanical appliances, in the year following succeeded in laying the cable;—when we remember that a few messages of the greatest importance to both England and America were sent through it, but that there was again a cessation of communication, which so damped the courage of all connected with it that for seven or eight weary years nothing was attempted; —and when I remember, having been a shareholder in the concern, that in 1865 a new effort was made, that new blood had to be introduced, and new agencies altogether employed, and when I think of all the difficulties, with which I was acquainted at the time, not only of getting up the capital, but of making the arrangements for the execution of so great a work, and that some of our leading men in the field of industrial enterprise, like Thomas Brassey, some of the greatest engineers and financiers, were associated together to carry out the work, and that it ended in the amalgamation of two manufacturing companies, by which was formed the Telegraph Construction and Maintenance Company:—you may conceive that this is an occasion to me of great and interesting importance. That Company started with the special object in view of laying the great cable between England and America, and it was again a case of peculiar effort to organise the means. I must give justice here to our sister-country America, and say that without the able and energetic assistance of Mr Cyrus Field, whose name must be familiar to many here, it is a question whether to this day we should have had ocean telegraphy carried out. He was one of the most enthusiastic and hopeful men, who could see no difficulties. Ladies and Gentlemen, the toast I have now to propose is, "Success to the Telegraph Construction and Maintenance Company," a Company which I have endeavoured briefly to account for. There have been scores of cables laid by this Company, but this is the fourth great enterprise the Company has undertaken. The 1865 cable, we all know, parted in mid-ocean, and the cable of 1866 was conceived to be a venture of the greatest uncertainty by the public; but it was started in full confidence by the able electricians and engineers connected with the expedition, and, led by Sir Samuel Canning and Sir James Anderson, they proceeded to the work without one doubt as to the successful issue. The doubts of the public at that time may be well computed by what was then the value of the shares, which were scarcely saleable. The cable of 1866, however, was laid, the cable of 1865 picked up, and the shares acquired an enormous value. The third cable was that from France to America, which is of so recent origin that I need scarcely allude to it, except to say that it was carried out and laid under the able superintendence of Captain Halpin, who now worthily fills the post of commander of this expedition. But I cannot allude to these matters without some reference to a fact of which some people in Bombay may still have recollection, that so far back as 1865 the Telegraph Construction and Maintenance Company endeavoured to raise the capital necessary to lay this very cable which is now about to be laid, and that it was thought at that time of Bombay's splendour and self-confidence that the whole capital might be raised in this city. I myself perfectly recollect that it was the wish—and the Company were quite willing that it should be so—that the honour and glory of laying this cable should be left to the Bombay community. Lord John Hay came out here with a prospectus cut and dry, and had he arrived three months earlier we should have seen this cable laid in 1866, and Bombay alone would have had the honour and credit of it. Circumstances defeated that, and the honour rests with England and the same small number of individuals who projected all the previous cables. It must not be supposed that this sort of investment has been in any favour at all in England till within the last two years. During the laying of each cable, there have been the same difficulties to encounter. It was a singular and fortuitous circumstance that a vessel of the magnitude of the Great Eastern was available; and great credit and honour are due to Sir Daniel Gooch, who is chairman of the Great Ship Company, as well as now of the Telegraph Construction and Maintenance Company, for bringing her to the work. I can testify to the unwavering faith Sir Daniel Gooch always had in this enterprise, and also to that of Sir Richard Glass and Mr George Elliot, as well as of Mr Pender, who was the great financial lever that insured success to this Company's operations. I should not sit down without a reference also to Captain Sherard Osborn, who for the last three years has been managing director of the Company, a man of extraordinary energy, and also a man of great faith. I should also mention that the Company has been suitably and worthily represented here of late by Mr Donald Cruikshank, who was with Captain Osborn in his China Expedition, and has been for some years associated with him in everything he has had to do. Captain Sherard Osborn has that rare faculty of finding the best men for the work to be done; and I am sure that in appointing Captain Halpin, the commander of the expedition, and all those connected with him, Captain Sherard Osborn did the best, and that all the arrangements have been made on the best plan. We have assembled here to-day to do honour to this expedition. No expedition of a similar character has started without a similar meeting to inaugurate it. I have myself heard the splendid eloquence of Mr John Bright on such an occasion, and also the fervent speech of Mr Cyrus Field, who carried enthusiasm and did much in raising hopes of success. And our gracious Queen has also in a signal manner marked the interest with which she views these enterprises, inasmuch as on the successful laying of the cable between England and the United States she was graciously pleased to confer two baronetcies and three knighthoods on gentlemen connected with the expedition. I do not think there could have been a more signal mark of her Majesty's interest in the expedition. I beg to propose the toast of All Success to the Telegraph Construction and Maintenance Company.

Mr D. Cruikshank, in returning thanks for the manner in which the company had received the toast, said: I thank you in the kindest manner on behalf of the directors for this kindness on your part. Mr Campbell has told you all about ocean telegraphy: of course I could not have said so much about it, not having had such an intimate acquaintance with the subject as Mr Campbell, and he has already spoken about the able chairman of directors, Sir Daniel Gooch, Mr Pender, and Captain Sherard Osborn. In reference to the latter, there are men around me who knew him when he was agent of the G. I. P. Railway, and those all know the energy he brought to bear on that enterprise. It was during his *régime* that for the first time the railway showed any return other than the guaranteed interest. I was only aware the other day that Mr Campbell was the first person to bring Captain Sherard Osborn to the notice of the Telegraph Construction and Maintenance Company as a man who would be able to carry on the work in an efficient manner. The energy that he has brought to bear on his work since he has been managing director of that Company is fully exemplified by the cable now on board this ship. The manufacture of this cable was only commenced last May, and the Great Eastern is at present in Bombay harbour, with coaling nearly completed, and in two or three days about to proceed on her voyage. I have not the least doubt that Captain Halpin, and the able staff by whom he will be assisted, will bring this expedition to as successful a termination as the laying of the French Atlantic cable, he having been in command of the Great Eastern during that expedition. Mr Campbell has expressed himself kindly towards me in saying that Captain Sherard Osborn made a good choice in appointing me to represent the Company here: I am very much obliged to him for the compliment. I have done the best I possibly could for all concerned, and I hope to see the enterprise terminate in a successful manner.

Captain G. F. Henry, agent of the P. and O. Company, said: A toast has been intrusted to me—"Success to this expedition, and the health of Captain Halpin and the officers of the Great Eastern." It gives me great pleasure to propose the health of these officers, from the fact that the Great Eastern was built for the purpose of connecting England with India by conveying large numbers of passengers, which would have been a serious blow to the P. and O. Company. To the present moment I think she is very much better employed, and will connect England with India in a much better manner than was originally intended. But I have great pleasure in proposing the health of Captain Halpin, a gentleman who has been selected by the very ablest men in England to command an expedition of such magnitude and such value as this. We ought to be proud to see him in Bombay; I am personally proud to see him, and I am quite sure that when you are told what has been done you will see that no time has been lost. Since the arrival of the Great Eastern she has taken in 8000 tons of coal, the shore-end of the cable has been laid, and in a few days she will set out on her long voyage, and on one of the greatest enterprises that has ever been taken in hand. I call upon you to drink to Captain Halpin, and success to the expedition.

Three cheers and a few more having been accorded to the subject of the toast,

Captain Halpin, in responding, said: I thank you much for the kind way in which you have honoured the toast and drunk my health, and will preface what I have got to say by reminding you that sailors are not noted as orators, and you cannot expect me to make a long speech. It would be presumption on my part to say I am not worthy of commanding the expedition, because it has been my good fortune to command the Great Eastern in carrying out the great idea of the original promoters by connecting England with India. I am proud to have the privilege of commanding the expedition, and I trust that in two months we shall put you on the same footing with Great Britain that America now enjoys in having perfect telegraphic communication. I hope you will not consider me too sanguine in saying so, after what we have already done in connecting England with America—for we have no chance of encountering greater difficulties on the present expedition, and I have no hesitation in saying that we shall connect India with England in the same time that we took to connect England with America. I hope Captain Edington of the Chiltern and the officers of the Great Eastern will allow me to thank them; and I take this opportunity of expressing myself publicly and saying that none could give me greater satisfaction than the officers who now serve under me, and that without such able assistance as I get from them there would be little chance of ever attaining the success we hope for. I would speak not only of the sailing department, but also of the engineering department of the ship; and I hope you will not consider me trespassing on your time if I ask you to drink to the health of the scientific branch, represented by Mr Laws. The engineering difficulties of laying the cables are matters of minor importance to the electrical management of the cable, or I may say the medical dealing with the life of the delicate thread we are about to lay. As I say, the sailor part of the work is a very minor thing indeed in comparison with Mr Laws' duty, as he has the electrical care of the cable; and I ask you to drink to the health of the scientific branch of the expedition, represented by Mr Laws.

Mr Laws, in responding, said that, as he had been compared to a doctor, he would assure the company that the cable was in a perfectly healthy condition; and that if, during the operation of submergence, any casualty incidental to the laying of cables occurred, though it might for a little retard the progress of the work, it would not affect the final success. Like Captain Halpin, he had every confidence in his staff, gained in similar operations in other parts of the world, and he had no doubt that the success of the cable would more than equal the contemplated requirements of the two countries.

Mr G. Foggo proposed "Prosperity to the British-Indian Telegraph Company." He would remember that he was not here to-day for the purpose of airing his eloquence, if he had any, but with the object of seeing the magnificent Great Eastern. He would wish the Company good dividends and good management, and would couple with the toast the name of Mr Stacey.

Mr G. B. Stacey, in reply, said: Ladies and Gentlemen,—You are doubtless aware this line will be a link (the largest, it is true) in a chain of cables to extend from England to China and Australia. The only existing link is the line from Alexandria to Malta. In a few weeks we hope that Bombay will be connected with Malta, and, two months afterwards, with Falmouth. A few months later and England will be in communication with the Straits of Malacca and Singapore, and, within a year after this, China and Australia will be linked on. Thus, in 1871, we hope that China and Australia will be connected with India, and with Europe and America—and this, with a few exceptions, by submarine cables. With regard to our communication with Europe, I think I am safe in promising that you shall have your messages in less than twelve hours; and when the Falmouth, Gibraltar, and Malta cable is laid, I trust and believe that your morning messages will reach home at about the same hour at which they are sent from here—allowing, of course, for the difference in time; and that afternoon and evening messages from Europe will be in your hands at an early hour the next morning.

Mr J. C. Parkinson said: Captain Halpin, Ladies and Gentlemen,—It is now my privilege to propose to you "Success and augmented prosperity to the Port of Bombay"—and in so doing I venture to say I express very completely the feeling of all who are going home in the Great Eastern when I wish Bombay success both for its own merits, which we have proved to be very great, and for the reason that we regard it as a thoroughly representative Anglo-Indian city. Representative in its enlightenment, its activity, and its wealth, we may well wish for Bombay that its future may be as rapidly progressive as its past, and that increased facilities of communication and locomotion may have their legitimate effect in swelling its importance and augmenting its trade. Nor is it necessary that we should hope that Bombay will ever play the part of the kine in the Egyptian's dream, and, by absorbing the commerce, injure or swallow up any one of its rivals. With the grand future which is before India—a future which can be read clearly by all who have eyes to see—it is obvious that prosperity for one port means prosperity for all, and that the commercial greatness of which Bombay is the type will extend and fructify throughout the length and breadth of this beautiful, this favoured land. I was much touched, if I may be permitted to say so, at the evidence we had the other day of the careful guard Bombay keeps over its feelings,—at the jealous care with which it restrains itself from emotional display. Knowing, not merely from the eloquent speeches which we have just heard, but from many other signs and tokens, how momentous are the interests involved, and how deep and heartfelt is the enthusiasm inspired by the enterprise which is to connect India with Europe, we had, I think, a remarkable instance of self-denial in the absence of all demonstration, and of all crowding on the occasion of the shore-end of the cable being laid. The impulsive peasants of Valentia, the hardy fishermen of Newfoundland, the busy people of Brest, had on previous occasions of a like character shown their interest and enforced their welcome by clustering round the spot, and by loud-voiced congratulations, as the all-important coil was laid to earth. But Bombay knew better. It preserved its calm unbroken; and for the first time in the history of submarine telegraphy the engineers and cable hands were absolutely alone when the foundation-stone, so to speak, was laid of a superstructure which, as I venture to think, is of more vital importance to Bombay than any one of the many noble enterprises with which her name is associated. This suppressed zeal, this dignified reticence, this exercise of the great Christian virtue self-denial, gives one a comfortable conviction of Bombay's strength of mind, and of her fitness to bear the trials which, as moralists tell us, wait upon prosperity. I quite feel that we may wish her to enjoy that blessing, without uneasiness as to its effects; and I therefore propose to you with all heartiness and without a single qualm, Success to Bombay. We drank the toast in private on the occasion I have referred to, and I ask you to believe that it was then given and received with all the affectionate consideration which Englishmen bestow upon absent friends. Ladies and Gentlemen, Prosperity to Bombay.

Mr Currey thought he need scarcely assure the able officers of the Great Eastern and of the expedition that there was no city in the wide dominions of Her Majesty which took greater interest in the establishing of telegraphic communication between India and England, and also between the other countries which he believed the Telegraph Construction and Maintenance Company and the British-Indian Telegraph Company proposed to connect, and he hoped all the operations of these Companies would be successful. The people of Bombay, he felt sure, would appreciate the immense exertions that had been made to insure the success of the cable. He would conclude by asking them to drink with enthusiasm to "The Ladies."

The toast was duly honoured, and Mr Currey called upon Mr Oliphant, secretary of the Byculla Club, to respond.

Mr Oliphant thanked the company in a few sentences on behalf of the ladies.

Captain Halpin then proposed the Health of the Officers of Her Majesty's Dockyard, who, he said, had been of great service to the Great Eastern, and had given much valuable assistance both in piloting the ship into her position and in mooring her safely, and giving him the benefit of their experience in laying the shore end in Back Bay. He begged to thank Captain Pryce for the kind way in which he had treated them, and for the valuable assistance he had given them.

Captain J. E. C. Pryce, Master Attendant, said: Captain Halpin, Ladies and Gentlemen,—I thank you much for the honour you have done me in drinking my health, coupling my name as you did with the officers of Her Majesty's Dockyard. I must confess I am a little taken aback, and scarcely know how to express my gratification for so unlooked-for an honour, and can only again thank you on my own behalf and in the name of the officers of Her Majesty's Dockyard and the officers of the port.

Captain Halpin said there was still one further toast, and that not the least important of the day—namely, the health of that very great and powerful organ, the Press, which was so worthily represented by representatives not only of Bombay, but from England and the Bengal presidency. It would be presumptuous on his part to point out the great benefits they all derived from a free press, which he had no doubt after the sailing of the Great Eastern everybody would acknowledge they had in Bombay, as he had no doubt all the shortcoming on the part of the ship, and all that people expected to see and did not see would be fully pointed out. He would couple the toast with the names of Mr Hooper of the 'Bombay Gazette,' and Mr Wood of the 'Times of India.' If Mr Wood and Mr Hooper thought proper in their quiet moments to launch out on the Great Eastern, he would say he hardly thought it was worth their while to begin in India, because she had been so well taken care of at home by the Press that it would be a pity to pitch into her too much in Bombay. And he would take this opportunity of excusing himself and officers for the condition of the ship. Since the vessel had been in harbour she had taken more than 8000 tons of coal on board, the men being kept at work day and night making preparations for the expedition, so that he hoped Mr Hooper and Mr Wood would deal leniently with them. He would ask the company to drink to the Press.

Mr Hooper, in replying, assured Captain Halpin that if he had had any fault to find he would have done it while the ship was here, not after it was gone. He thanked the company for the way in which they had honoured the toast; but he felt inclined, like the Commander-in-Chief at Poona, to bring himself up to "attention," and to say, "Gentlemen, I thank you."

Mr W. M. Wood said, that after Mr Hooper's acknowledgment of the compliment, he need do no more than thank them on his own behalf. It was almost selfish for them to desire the prosperity of the enterprise, seeing that the Press had become so dependent on the Telegraph that one could scarcely get on without the other. The people of Bombay having had just sufficient experience of direct communication with Europe to enable them to appreciate its advantages, they would look forward with great interest to the completion of this new line, and he felt confident their anticipations would be satisfied by the success of Captain Halpin's expedition.

The company then went on deck, each going his own way to see the wonders of the monster ship. By five o'clock most of the guests had seen over the ship, and, it being then nearly time to return home, the barge and tug came alongside. Every one appeared highly gratified with his reception, and many of those who had been on board the barge on her outward voyage were missed on the return-trip, showing that they had found a hearty welcome, and did not care about leaving so soon. After the barge was towed away from the ship's side, cheering by the guests, for the captain and the ship, and return-cheers by the crew led by the captain, continued till the increasing distance between the two parties prevented even the lustiest cheers being heard. The tug and barge reached the bunder about half-past five o'clock.

CHAPTER IV.

THE DEPARTURE FROM BOMBAY—THE SPLICE—THE GOVERNOR'S FAREWELL—PAYING OUT—THE VOYAGE TO ADEN—THE INDIAN OCEAN—LIFE ON BOARD THE GREAT EASTERN.

On board the Great Eastern, Sunday, 13*th February.*—The wearisome coaling has gone on without ceasing ever since the guests left on Friday afternoon, and all is ready for to-morrow's start. The wind is freshening, and a perfect fleet of native boats, laden with bananas, fruit, and vegetables, with paroquets, sticks, monkeys, and fancy wares, are clustered round the Great Eastern, the owners of which are bent on a final " deal " with the sailors.

The wind blew so hard, and the sea was so rough when a friend and myself came off in the native sailing-boat this afternoon, that we had to tack, and tack, and tack again before we could reach the ship. The swarthy boatmen pretended, with transparent cunning, that their bargain with us was made under a misconception, and were for landing us on H.M. troop-ship Jumna, lying close by the piers, as their reading of the phrase "big ship." We were firm, however, and they were kind enough at last to convey us to the Great Eastern, and to forego the threatened pleasure of being taken before a magistrate next day, averring roundly that they wished for no row, "Bobbery nein Sahib—bobbery nein!" and would take the number of rupees originally fixed. The pilot told us afterwards that we had paid them three times their fare.

My rapid travelling had knocked up the Madrassee servant, Sheik Rustum, I took with me on my tour in the interior of India—a man vouched for by the excellent Palonjee of the Adelphi Hotel; and his place has been filled since my return to Bombay by one of the best-natured, most willing, and most helplessly thick-headed of "boys": a Bombay "boy" is a general servant, and may be a man of fifty. This torpid youth accompanied us out to the Great Eastern, and being naturally black, turned green under the influence of sea-sickness; in fact, were I of a revengeful turn, his piteous appearance this afternoon would have condoned amply his many sins of omission and commission since he entered my service a to-day, and one of the native coal-barges at the Great Eastern's side shipped so much water that she went down like a stone, ten minutes before we got on board. The great ship herself is full of the indescribable bustle which precedes a start. The last coal-barge discharged its cargo at twenty minutes to six P.M.; and we, grimy but grateful, are looking forward to splicing with the shore end, and bidding Bombay farewell to-morrow.

14*th February.*—The Great Eastern lifted her anchor, and was fairly under way for Aden at five minutes past five P.M., with the splice with the Indian shore end successfully made. She left her harbour moorings this morning at a few minutes past eight, dropping anchor at five minutes to twelve A.M., in eight-fathom water, and three miles from the coast, for the purpose of splicing the 2375 miles of cable she has on board, with the shore end laid and buoyed by the Chiltern on the 7th instant.

Steaming slowly from her late mooring-place, the Great Eastern was abreast Colaba light-ship at a quarter past nine A.M.; came up with a gaily-decorated pilot-boat, and bade her pilot good-bye three quarters of an hour later, and took Sir Seymour Fitzgerald and a small party composed of his aides-de-camp and personal friends on board, as soon as she dropped anchor.

His Excellency, who has evinced the warmest interest in the undertaking, accepted an invitation to witness the operation of splicing, given him by Captain Halpin when we dined at Government House; and the salute of seventeen guns with which he was greeted, and the prompt substitution of the Union Jack for the blue ensign at the mainmast's head, told the people of Bombay the precise moment of their Governor setting foot on board.

It was determined to effect the splice on the Chiltern, which ship was lying by the shore-end buoy, some 200 yards astern; and the delicate operation was proceeded with at once, Sir Seymour Fitzgerald and the gentlemen of his party accompanying Captain Halpin on board her. After the heavy shore end was picked up from the buoy, and a portion of the cable on the Great Eastern passed over her stern and on to the Chiltern's deck, the laying each line open, the fusing the two slender copper cores, the melting and smoothing down by hand the layers of gutta-percha, the application of Chatterton's compound, and the final closing up and retwisting of the thick protective coil, occupied some hours, and it was a quarter past four P.M. before Mr London pro-

H Adlard sc.

JOHN PENDER, ESQ. F.R.G.S.

Chairman of the British Indian Submarine Telegraph Company.

Wm Blackwood & Sons.

nounced the splice complete. The chief of the Telegraph Construction Company's electrical staff on board the Great Eastern, Mr Laws, sent messages through the entire line and to the shore long before this, and within a few minutes of the two copper wires being fused. The Governor, Captain Halpin, and party, returned to the Great Eastern immediately after the splice, when the former, in a few graceful sentences, proposed success to the British-Indian cable, and testified to his personal knowledge of the obligation under which India will lie to Mr John Pender, to whose individual faith, energy, and public spirit, said his Excellency, she will owe her immediate telegraphic communication with England. The great ship was under way before Sir Seymour Fitzgerald returned to his steam-yacht the May Frere, which he did after sending a message through the cable to Bombay, directing that Lord Mayo should be informed by telegraph of his presence on the Great Eastern, and of the successful commencement of the enterprise. Just before dusk, the May Frere, as if loath to part with us, steamed alongside once more, and wished the Great Eastern God-speed in three ringing cheers, led by the Governor in person. The paying-out has proceeded regularly, and all promises well.

The splice between the thick or shore-end portion, ten miles in length, and the next or intermediate section, passed gently over the stern at twenty-eight minutes to seven P.M. We have bid the land good-bye, and shall have nothing but sea and sky before us till we sight Aden.

The first day's dinner in the steamer in which you are about to make a long voyage, is always an experimental meal. You put "test questions" to your next-door neighbour; you take fancies; you indulge mentally in partiality and dislikes. You and those round you will live in a glass house for the next few days or weeks; and your weakness certainly, and your strength perhaps, will be gauged with more or less accuracy by the male and female inquisitors you now see for the first time, and whom you will probably never see again after you reach port. There is nothing like a passenger ship for finding out all about a man or woman, and he or she is perhaps wisest who is frankest. Deception is futile. "We *are* a newly-married couple; were married last June by my cousin, Rev. Hugh Jones, at St Mary's, Hatching; my pay in India is so many rupees a-month; wife so much down, so much more at her father's (a lawyer) death; am going to my station of Simkinabad up-country; chief amusement, shooting; chief hope, promotion; have had jungle fever three times; am a member of the Church of England, and stand five feet ten;"—is the form of confession once recommended to me by an old P. and O. traveller. "What they don't find out they'll invent, my boy," added this sage; "so it's better to give them the straight tip from the beginning,—it's more comfortable for all parties,—it encourages confidence, and you know where you are." The first time we sat down together in the Great Eastern was remarkable for the complete absence of the usual features attending these initiatory repasts. All the people knew each other personally or by reputation. Each had an appointed duty. There were no mysteries, and there was nothing to find out. Moreover, all had a topic in common, on which diversity of interest was impossible; and the cable and its concerns would, we knew, be our standing conversational dish. The "settling down" was instantaneous; and even when it was discovered that the party at Captain Halpin's table was thirteen in number, I don't think any of us lost heart. The provision made for the corporeal wants of those on board had been too excellent for that, and was as exceptional as the other specialties of the ship. Coffee at six A.M., breakfast at nine, luncheon at one, dinner at six, is a tolerable curriculum; but it did not by any means compass the whole of the steward's responsibility in the way of catering. A cable ship on duty has a dual life, and night is as important to her as day. Half her staff are always on duty. Watchful eyes never leave the scale marking the condition of the cable, and the entries concerning it are made every five minutes as regularly and promptly as in the daytime; while in the engineer's office, near the dynamometer, the steady work of watching and registering the paying out, and the marking the quantity of slack, is unceasing too. Now, to work well, it is maintained that men must eat well; and it sounded pleasant to hear Captain Halpin give instructions at dessert just now, that supper should always be laid at twelve P.M., and kept on the table for the electricians and engineers on duty, and that one steward should always sit up to attend to their wants. Besides the dining-table I have mentioned, which is laid in what used to be the ladies' saloon, there was another, at which thrice the number of assistant engineers and electricians sat down, in the grand saloon. Neither of these splendid apartments have been has somewhat dimmed the brilliance of their gilding and ornaments, they are as they were when the Great Eastern was pronounced finished by Brunel. The old second-class saloon, the largest in the ship, has ceased to exist. An enormous tank, holding 1110 miles of cable, occupies its place; and many of the cabins have not been restored since they were subdivided and cut up by the speculators who chartered the Great Eastern for running between America and France. But for a party of our numbers the ship is as she was in her earliest and most luxurious days. Every man I know on board has a cabin to himself; and in the saloon appropriated to my individual use, I could seat twenty people comfortably at dinner, and could find sleeping accommodation and cubic space for twice that number, without their being as much crowded as they would be in any other first-class steamer carrying its full complement of passengers.

Those who have not made a voyage in the Great Eastern before talk over these and her other merits under the soft Indian sky, making engagements to explore her more recondite wonders—her engine-rooms, her famous tunnel, her cavernous depths—on the morrow, and now and again strolling to the stern to watch the cable, or look into the tank from which it is unwinding. The sentiment expressed on all sides is, May the work end as successfully as it has begun.

Under Captain Halpin, who is not only in command of the Great Eastern, but of the whole Expedition, is Mr Laws, the Telegraph Construction and Maintenance Company's electrician; and under this gentleman there will remain at Bombay, till the cable is laid and the certificate granted for the Aden section, the accompanying electricians and assistant-electricians:—Mr May, Mr Stephenson, Mr Dallas, Mr Beckingsale, Mr Wittrick, Mr Morton, Mr Tronnsen.

The electricians who keep with the cable being paid out are:—Mr Oliver Smith, Mr Fisher, Mr Clark, Mr Padmore, Mr Wisley, Mr Campbell, Mr Cross.

The electricians who will remain at Aden until the whole of the cable is laid and the certificate granted are:—Mr Brown, Mr Mayhew, Mr J. Donovan, Mr Cunard, Mr Paul.

Mr R. London is the chief of the Telegraph Construction Company's engineer's staff, and under him are:—Mr Lucas, Mr Johnson, Mr Alexander, Mr Donovan, Mr Riddle.

Messrs Windle, Joss, Harris, and Sherwin, are the foremen of the cable hands.

Mr Beckwith, who has been the Great Eastern's engineer in all her great expeditions, fills his usual important post; Mr Anderson is her chief officer; and Mr W. H. Allchin her surgeon.

Mr H. C. Forde, C.E., with three professional assistants, accompanies the Expedition as the representative of the British-Indian Telegraph Company.

15*th February.*—All going well. At eight A.M. we met H.M. troop-ship Euphrates, which, in her laudable anxiety to give those on board her a good view of the Great Eastern, put the Chiltern in some jeopardy. The Chiltern keeps on our starboard side, and is at times so near us that we can easily discern the figures on her deck. The Euphrates bore down between the great ship and the Chiltern; and when near to us, turned suddenly, and crossed the Chiltern's bows so closely, that the latter, who has been under sail all day, had to "put her helm hard-a-starboard" to clear her.

The electrical tests prove that the cable is steadily improving in condition as the deep water is reached; while the speed at which it is paid out has been increased from four to five, and, for a short time this evening, to six knots an hour.

The splice between section E and section B (the two sizes of the intermediate cable) was paid out at two minutes past five A.M. Greenwich time, at a distance of ninety-six knots from the shore-end splice. The electrical and engineering records are kept, it should be stated, in Greenwich time, while Mr Moody's (the navigating officer of the Great Eastern) figures are given according to ship's time. The latter, of course, varies every day; but at noon there were 4 hours and 30 minutes between the two. Six observations are taken daily by Captain Halpin, assisted by Mr Moody.* Particulars at noon—latitude by observation, 18° 35′ 30″ N.; longitude by chronometer, 71° 11′ 15″ E. Course and distance from shore-end splice, S. 76° 20′ W.; distance, 96; course and distance to position by Aden, S. 76° 21′ W. (1540 miles). We are in a smooth and bright blue sea, with whole flocks of flying-fish hovering over the crisp and curly waves, now seeming to settle for a moment and then disappearing, to be followed instantly by others. Their scales glistened in the sun, and they resembled a flight of white swallows when seen from the paddle-box in the early morning.

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* Corrected official returns of the statistics of the Expedition are given in the Appendix, Nos. I. and II., pages 303 and 304.

16*th February.*—The calm regularity with which the paying-out goes on, the absence of all stir or fuss, the perfect order with which the three great departments—the nautical, the electrical, and the engineering—fulfil their allotted tasks, and the beautifully docile behaviour of the cable and machinery, are the things impressing us most. There are two sonorous gongs hanging outside the test-room and in Captain Halpin's cabin respectively, which one cannot help eyeing with the mingled dislike and fear of the savage who beats his idol when it refuses or proves indifferent to his prayers. How fervently we hope these gongs may remain useless! how much we dread their voices being heard was proved by a tragi-comic incident at breakfast. The first intimation of a fault, or of disaster to the cable, will be a note from one or other of these gongs, at the first sound of which the ship will be stopped, the brakes be put on, and the engines reversed. It was while we were talking proudly of the great ship's elasticity and good behaviour, and of our having carried out of Bombay 3000 tons more dead-weight than when she was laden with the Atlantic cable in 1865—an occasion which caused some wise people to maintain her capacity for cargo to be fully tried—that the sound of rapid drumming upon metal was heard. Men looked at each other dubiously for an instant, and then rushed from the table and upon deck pell-mell, Captain Halpin leading, Mr Laws coming next, and Mr Beckwith, the ship's engineer, making an exceedingly active third. The length of the grand saloon and the staircase leading from it to the deck were got over at racing speed, Mr Forde and the rest of the company coming up at the entrance to the testing-room. That we were victims to a false alarm was evident at once. All was quiet at the spot from which the keynote of disaster had been supposed to come. The operators were placidly pursuing their labours, one watching the spot of light upon the scale, two others working out their calculations from his data; and all three showed their astonishment, without speaking, at the sudden crowding round their sanctum's door. It was not necessary to ask questions, or to look for explanations; and it was only on the return to the breakfast-table that the drip-drip of a shower-bath was found to have created the alarm. Drop water steadily on a metal bottom and you have a fair imitation of the sounding of a gong; and the gentleman whose late rising caused him to bathe while we were at breakfast, was adjured to give us warning of his intentions in the future, as we resumed our seats.

The Government troop-ship Jumna overtook us at half-past one P.M., signalling her name when she was abreast of us some three miles to the south. The Great Eastern replied, "We have communication with the shore, and will report you all well," and fulfilled her promise soon after.

It would astonish friends at home, and all accustomed to long sea-voyages, to know how easily passengers who had no duty connected with the Expedition (were such on board) might ignore the work in hand. Cable-laying from a ship like the Great Eastern is by no means an obtrusive process. You may walk her deck from one end to within a few paces of the other, on the starboard side, without detecting a trace of it. You may mount up to the highest point on one of her paddle-boxes, and spend your day upon her bridge; you may go through the whole routine of eating, smoking, chatting, lounging, reading, and promenading, without once seeing the cable; and you may do all this with ten times the freedom you can secure under any circumstances upon any other ship in the world. The whole of one side of the deck is free, and as the paying-out at present is from the aft tank, you have actually to make a special journey to the end of the port side of the ship before you can see aught of the important business you know to be going on. To understand this thoroughly, it must be remembered that cabins, offices, workshops, and machinery form a continuous line of buildings up the centre of the Great Eastern's deck, dividing it into two parts or streets an eighth of a mile long, and running parallel with each other. At the end of one of these are the wheels and drums running from the top of the aft-tank to the stern; and between them and the two thoroughfares are wooden houses effectually shutting them out. As a matter of fact, they are of course the centre of interest; but there is something very impressive in the vastness of the space and the varieties of life around them. Many of the sailors are bringing Indian monkeys or parrots home; and to watch the gambols of the former creatures, to inspect the farmyard when the cattle are turned out for exercise, or a few errant chickens are being caught, to play for a moment with the goats which run free, to join a party busy over charts and plans in the saloon, or to occupy yourself in your own cabin, and to then make your periodical pilgrimage to the paying-out wheels, is to realise the steady march of time, or the inexorable decrees of fate. What are you, or your doings, to the link of intelligence being gradually created between the gorgeous East you are leaving and the busy West to which you hope to return? You sleep and grow weary, your vitality is keener at one time than at others, and your perceptions and feelings more or less acute; you have a hundred diverse cares and thoughts. But yonder mass of wheels moving to a given end, and the half-sentient coil they are committing to the ocean, never vary in their appointed duty, visit them when you will. Should you in the darkness of night leave a sleepless couch to ask restlessly and needlessly if all is well, you find everything around you altered, except the cable and its laying. Things inanimate, which are as familiar as your own chattels in broad day, assume fantastic and unreal shapes as you plod past them in the semi-darkness along the deck, and the aspect of sea and sky have changed. But the strong wire is pursuing its task unwaveringly, and buries itself in the ocean at a rate which neither accelerates nor is slackened for night or day. To such perfection is the machinery brought, that it appears to be self-acting; and the elements themselves do not seem more impassive to man's anxieties, or more independent of man's care, than a submarine cable while all goes well. We have now passed into 1876 fathom water; the depth increasing from 100 fathoms to 870 fathoms in the course of 12 knots' progress, showing that we are laying the cable down a gradient of 1 in 16. To-day at noon we were in latitude 18° 12′, longitude 69° 8′. Cable paid out since yesterday, 130 miles. Total cable paid out, 228.87 miles. Distance run since yesterday, 120 miles. Total distance run from Bombay, 216 miles. Thermometer: air, 89°—water, 79°. Barometer, 29.76. Wind, N.N.E.

17*th February.*—Captain Halpin's birthday, and another auspicious day of cable-laying. At dinner we drink heartily to continued prosperity to both. Our success is so uninterrupted, that even the least sanguine begin to say we may reach Aden without being delayed by a single casualty. No one has supposed that we should meet with serious disaster; but temporary checks, caused by the discovery and cutting out of faults, are so much in accordance with previous experiences that they are to be expected. Hitherto our progress has been unchequered. Mr May, the electrician stationed at the cable-house, Bombay, complained this morning that the reply to one of his questions was from three to twelve seconds late—no bad proof of the watchfulness exercised and the exactitude looked for. The cause even of this trivial delay was thoroughly known, however, in the Great Eastern's testing-room, and Mr May's remark was corroborated on reference to the record kept there. It was decided before starting to have as few messages as possible between ship and shore; and the obliging offer made by the agent of Reuter's Company at Bombay, Mr Collins, to supply the Great Eastern with European news as it came in, was thankfully declined. The frequent transmission of messages during the process of paying-out has been found in practice to interfere with the testing. A faulty part of the cable might easily slip over the stern while the ship was talking with the shore, and might not be discovered until the message in progress had been taken down. Accordingly, our communications are limited to a daily statement from the Great Eastern of her position at noon, and to its acknowledgment by Mr May.

The weather is exquisite, the sky nearly cloudless, and the sea smiling. The small wavelets of the latter bound and play before us, but the crisp curliness of yesterday and the day before has gone, and in its place we have what resemble the ripples on a large inland lake. The Chiltern is the only vessel we have seen since we parted with H.M.'s Jumna, and she keeps her position at the Great Eastern's side like some faithful esquire of old, ready to aid his knight in all emergencies. It is one of the topics on deck to speculate upon the smallness of the quantity of coal the Chiltern is consuming. For the breezes have been so favourable since we left that she has been under canvas all the time, holding her own bravely with her consort, and never varying her position of from half a mile to a mile and a half from the Great Eastern. This uniformity of pace between the two ships has a curiously pictorial effect to those looking from one to the other. The Chiltern, while really going gently before the wind, does not move perceptibly, and looks as if her white hull and full sails were painted against the bright blue sky. There is all the evidence of motion, and yet she does not seem to move, for the Great Eastern is as an island; and to see the Chiltern, by the hour together, with sails set and under a favouring breeze, keeping parallel with a given part of our own ship's deck, has about it something unreal. It is as if you saw a regiment of soldiers marking tration of the poet's "painted ship upon a painted ocean." In the mellow moonlight, too, the Chiltern has many admirers. On some evenings we can trace the outline of her masts and sails distinctly, at others she drops coquettishly astern, when the lights at her side and her mast-head seem, in their steady fixity, to belong to some island-lighthouse we have passed without observing. Nothing has changed with the cable, save that the part submerged continues to improve in insulation. To mention it, or to ask after the paying-out, is to bring a pleasant smile to every face at once. The wheels at the stern and the line going over them are the centre of happy thoughts; and though now and then some would-be prudent person cries, "Don't let us congratulate ourselves yet—let us wait!" the tone of the ship is too quietly jubilant for him, and it is clear that doubts are few.

At noon to-day we were in 2170 fathom water, lat. 17° 37′, long. 67° 16′. Distance run since yesterday, 112 miles. Cable paid out since yesterday, 130 miles. Total distance run, 328 miles. Total cable paid out, 360 miles. Barometer, 29.89. Thermometer: air, 84°—water, 80°. Wind, N.N.E.

18*th February.*— We have been reminded

twice within the last twenty-four hours that our unbroken good fortune is by no means a thing of course. If the impassive regularity with which the paying-out machinery performs its task of letting the cable fall gently into the sea has disposed one to regard it as something above vicissitude and independent of supervision, either of the two incidents of to-day would have sufficed to bring about more sober views. It is known that the mixture of pitch, tar, and ground flint with which the outer coils are covered will answer its special purpose admirably. The teredo's fondness for hemp is more than neutralised by its hatred for the pitchy compound in which the Telegraph Construction and Maintenance have steeped the Indian coil, and one of the chief enemies to submarine cables in hot latitudes has been grappled with and foiled. But pitch has other properties besides being repulsive to the palate; and the stickiness, which is one of its characteristics, is fully developed when the thermometer outside the tanks ranges from 84° to 89°, and when the tanks themselves average 75°. From time to time, as the coil has unwound itself, it has shown signs of adhesion; and those looking down the tank from the deck have been struck by a sharp crackling sound, as if plasters were being removed or linen torn asunder. Each "turn" or circlet of cable had, however, made its way upwards without moving its next neighbour, up till to-day; and it was rather as an indication of the watchfulness necessary, than as a possible cause of delay, that the lingering attachment of each coil for its fellow was marked. The 596 miles of deep-sea cable in the aft-tank are, however, nearly paid out, and the bottom layers are being rapidly reached. Each layer or stratum represents about four miles of cable, and is paid out from the centre; so that when the words "last turn" are shouted by the officer on duty in the tank, the cable hands there advance rapidly to the crinoline and see that the new layer begins its work of unwinding and ascending with regularity. It was found at this juncture that the inner coils of the cable were adhering to the wooden framework in the centre of the tank. The minute particles of pitch which had detached themselves during paying-out from the lengths above had settled down to the bottom of the tank, and heat and superincumbent pressure had done the rest. There was no time to be lost, and the ship's speed was slackened, and she was eventually stopped, while the engineers applied their remedies.

The whole success of the operation of laying depends upon the cable going regularly out. A complication of coils like a tangled skein of silk, and ending speedily in a broken cable, would follow instantly upon a second layer becoming mixed up with the right one; and the reader has but to open a ball of string at the wrong end, and to suppose himself compelled to pull at it with an iron clutch, to realise a struggle between cable and machinery and its certain end. In the instance before us the pitch was cleared away and the turns of cable freed by the hands in the tank, so that each was made to pass upwards without difficulty.

The rather alarming signal from the tank, "Stop the ship!" had been given once before, and was due to the outgoing cable catching for a moment one of the "feather edges" or spars of wood used in the course of packing it in the tank. The wood gave way, however, the cable clearing itself without difficulty, and the delay was so brief that men sitting in the saloon were unconscious that it occurred. Thus satisfactorily have the first two casualties which have arisen in the laying of the British-Indian cables passed by. Neither was important, as matters turned out; and the promptitude with which each was met explains and justifies the confidence of every one on board.

The last of the cable in the aft-tank will be paid out soon after midnight, and the most critical operation the great ship has had to deal with since she left Bombay will be performed. This transfer from tank to tank is always a matter calling for the utmost care; and I well remember standing with Sir Richard (then Mr) Glass, in 1866, outside the Valentia cable-house, at Foilhummerum Bay, while the Atlantic cable was being laid, and when a message came to him from the Great Eastern that the paying-out from the middle tank had commenced successfully. "I've never once doubted the result, as you know," said Sir Richard; "but now that the last change of tanks is over—mark my words—success is a certainty, and the first message from America will be here in a few days;" the recollection of which remark impresses me with a sense of the importance of the particular work to be done to-night. It becomes monotonous to record the fineness of the weather. There have been some light fleecy clouds floating by to-day, and the breeze is fresh enough at certain places—notably the stern and the highest part of the paddle-boxes; but the sea remains as calm and still as if the elements were enlisted on our side. We have been looking in vain for the P. & O. mail steamer from Aden for Bombay. According to our calculations, we should have met her some time in the night; and there are presumptuous people among us who hint that she must have either broken down or gone out of her course. Particulars taken at noon show latitude by observation to be 17° 5′; longitude, by chronometer, 64° 53′ 45″. Cable paid out since yesterday, 153 miles. Slack on total distance, 9.6 per cent. Distance run since yesterday, 140 miles. Total cable paid out, 513 miles. Total distance run, 468 miles. Thermometer: air, 84½°—water, 77°. Wind, N.W.

19*th February*.—The aft-tank has been emptied successfully, and the paying-out from the fore-tank has commenced. A moonlight night; a smooth sea; a mild and balmy atmosphere; an experienced, and, what is almost as important, a cheerful and willing staff and crew; past success as an encouragement, and a full sense of the importance of the enterprise as a stay, are the conditions one would select for the work we have just seen done under Captain Halpin's personal supervision. It was pleasant, at all events, to know that our chief had these things in his favour; and the extreme quiet-ness with which those employed went about their several duties, the momentous character of the preparations, and the extreme rapidity of the change itself, are all things to be remembered. It may be doubted whether, in spite of all that has been written concerning expeditions such as this, the scene we have just witnessed can be brought before the reader by description. It had totally different characteristics to any of the pictures of cable-laying I have seen; and many of us expressed regret at the absence of Mr Robert Dudley, the accomplished artist who has on more than one occasion accompanied the Great Eastern when cables have been laid.

At a quarter to two A.M., I was roused by the news that the change from tank to tank would take place in half an hour. To hurry on deck and to find in the ship's general aspect indications of expectancy and of suppressed excitement, was the work of a few minutes. The long trough running from end to end on the port side was in gala dress. Instead of looking in the darkness like a heavy and swollen set of posts and rails put up to impede locomotion, or to keep cattle from straying and getting lost, its use and importance were fully seen. The wheels over which the cable will pass after the change is made and the fore-tank reached, and the passage in the trough along which it will be brought, are clearly visible, for a row of swinging lamps hung at short intervals light up every inch of the space, and suggest a festal illumination. These lamps are so arranged that their light is concentrated upon the trough below; and it is only when you stand close by that you discern the men who are on guard, and who are in shadow by the wheels, or waiting by the bulwarks opposite;—for both the port and starboard watches are on duty, and every soul in the ship, save a few invalids, has found his way on deck. Following the trough to its end, we visit the fore-tank first, and find it also decorated with swing-lamps, and the cable hands appointed to it already on duty. The coil is visible, but the tank is so full of cable that those standing in it have to stoop to prevent themselves knocking their heads against the deck. All is quiet. The exquisitely-symmetrical packing of the cable, which, as it lies there, looks as if its rings within rings had been carved out of some solid material and were now in one block, attracts the eye first. Then the immense distance which the cable has to run between the stern of the ship and the tank with which it is connected, come home to one as we thread our way to the aft-tank. A group of cows and some goats were lying on the deck as we turned, chewing the cud peacefully. The moon was up, but thick white clouds obscured her light, and the line of lamps over the trough made the ship look inconceivably long and unusually dark. Down its entire length—past the houses of the sheep and pigs; past the huge lifeboats we saw being examined and strengthened in the morning; past the half-closed door of the testing-room, where the flood of light within shows the operators maintaining their unceasing watch; past the captain's cabin, which is a sort of landmark or half-way house; past offices and deck-cabins innumerable,—and we have finished our pilgrimage, and are at the other tank. It is nearly empty. Let the reader imagine he is peering into a circular cavern some twenty-five feet deep, and that such cavern is illuminated by as many lamps as a Parsee drawing-room or an Armenian church. Day by day the huge well has become deeper as its contents have discharged themselves, until, from being able to touch those within it with your hand, they have receded to the distance named. There are several openings in the deck up which floods of light come mysteriously from below, and from which views of this cavern can be obtained. About these are clustered observers, some squatting, some kneeling, all looking downwards, as in the children's pictures the Persian king gazes at the prophet Daniel in the lion's den. No one speaks above a whisper, and no word is heard save in connection with the work. There is what looks like a huge Catherine-wheel between you and the flooring of the cavern, and as this flooring is obviously composed of cable, you, remembering the four miles each layer represents, begin to think you have been called too soon. "You forget the ten miles of Aden shore end," was whispered to an inquirer, who made a remark to this effect—"It is that which we see now, and the 'last turn' of the deep-sea line will be called out shortly." This was, perhaps, the most picturesque part of the proceedings. Everybody was about. Captain Halpin gave directions, and satisfied himself as to particular men having performed certain preliminary duties. Mr London, Mr Laws, Mr Forde, Mr Allchin, and the whole staff of assistant engineers and electricians who were not actually on duty, were assembled round the various openings looking into the tank, and were in darkness, save when their faces and figures were illumined by flashes of light from sudden changes in the position of the swinging lamps. Every few minutes a deep voice from below called out the number of "turns" before the last one, as a note of preparation to the men above; and this broke the monotonous hum of the cable passing over the wheels, and the low-voiced directions and questions, in a way which reminded one of the croupier's "Make your game."

All this time the Chiltern, which had been informed by signal of what was going on, kept steadily near us. She was more like an island lighthouse than ever, for her lamps and an indistinct black outline were all we could see; but she conveyed a great sense of friendliness by thus drawing closer at the critical time.

It will be readily understood that the line coming from the tank, and which was nearly all expended, had to be paid out, and the bight connecting it with the other tank passed through the ring and so to the wheels without a moment's delay. Although the ship's speed is slackened, and her engines stopped, the cable would by its own weight continue to run on into the sea if the "stoppers" were not put on and its impetuosity checked. These stoppers consist of stout hempen ropes, which have been unlaid and plaited, as well as tailed-in and tapered down to a fine point at each end by hand, so as to give the maximum of holding power while insuring a soft surface, and avoiding all risk to the cable. They are wonderfully like what one would suppose the false hair of a fair giantess to be. These plaited stoppers are at the appointed time wrapped round the passing coil by men standing on each side of the "lead" or cable-pathway, and close to the final wheel at the ship's stern. The fastenings of these hempen stays are so arranged that they can be tightened or made loose by a turn of the hand, and indeed resemble in their operation "the strangler's knot," demonstrated to me with a pocket-handkerchief and on a warder's arm by an aged Thug convict at the Jubblepore School of Industry a few weeks ago. The brakes are put on as well; but it would be hazardous to apply mechanical checks only, and it is by hand, and with what would be called tenderness if it were applied to a living thing, that the final orders are carried out. The speed of the cable's fall into the sea is thus checked with the greatest nicety, or permitted to have full play, as the word is given by Captain Halpin, who is crouched under the paying-out gear, and on watch at the tank's mouth. Within the tank the cable has reduced itself steadily, so that "last twenty turns," "last ten turns," "last six," and finally "last three turns," are called in speedy succession. There was some of the old trouble at the centre when the paying-out of this "flake" or layer commenced, and the men had to pull the cable gently from the side of the framework. Since then all has gone on with methodical smoothness, and now that the words "three turns" are heard, the ship's engines are reversed, and her way stopped. The canvas coverings in which the bight or loop from the fore-tank has been swathed have been removed some time before, as well as all other obstructions. The bight is then passed through the framework, so that both sides of it are in the ring. This is the supreme moment, and as the bight passes gently from hand to hand, each man on the telescopic frame doing his part to prevent the two portions of it touching, it is impossible to avoid speculating upon what would happen if a single link in the complex chain of cause and effect were to fail. Suppose one of the brakes were to give way, or the men at the stoppers to misunderstand an order, or the ship's engines to be given play too soon, or the bight to slip from one of its guardians, and to overlap itself, a twist, a tangled kink, injury to the cable, destroyed insulation, and, at the best, delay for cutting-out and resplicing, would all follow. As it is, it pursues its course gently into the long trough, and the cable from the fore-tank is being paid out without the delay of an instant. The stoppers and brakes are applied again a few minutes afterwards, but for an ordinary bit of work. The "knife" of the large drum which keeps the cable in its place is partly worn by friction, and an opportunity is given to renew it, the ship being again stopped and the paying-out checked. In twenty minutes, and after two or three trials, the new "knife"—which is not the least like what its name suggests, being a heavy piece of metal like a section of the outer ring of a locomotive's wheel—which is fastened to the side of the drum, for the double purpose of protecting the latter, and of preventing the ascending cable from overlapping, is pronounced complete, and the paying-out is going on as regularly as ever. What is difficult to forget is the perfect discipline and quiet with which the work was characterised. Every man was in his place, and did what he had to do without noise. I have heard twenty times more clatter and fuss over the simple working of a sewing-machine than took place during the whole operation of changing tanks. Our interest will now centre for a time upon the fore-tank. The one aft has played its part, and is already empty and desolate. The shore end lying at the bottom of its vasty depths has been flooded with water, and to look into it now is to see a large and ugly well, the contents of which are agitated as constantly as the ship moves, and the general aspect of which is unpleasantly muddy and foul.

Sunday, 20th February.—A quiet Sunday, with nothing to break its peaceful calm. The sheeny sea is crowded with jelly-fish, which are to be seen floating past the ship in countless thousands. They are larger and more beautiful than those met with in northern waters, being of delicate hues, and with gracefully-slender pink petals, which expand and contract like those of some lovely flower. Sorabjee, the Parsee amanuensis I brought with me from Bombay, invites theological discussion—"this being your good day, sir,"—and I examine him on the book he reads so diligently every morning. He shows it me with considerable pride, and I find it extremely like a Romish missal, but with a gilt figure of Zoroaster ("he who came from heaven 4000 years ago to bring my religion") in place of the sacred emblem. It is printed in the Persian character; but in every other detail, such as gilt edges, morocco binding, brass ornamentation, and clasp, it is just such a volume as we see carried at home. "These are my prayers, sir; it is my religion to tell prayers" (this, quite as if it were a Parsee peculiarity). "No, sir; we don't want to make all the world same as Parsees, and we don't want Christians to change. Good men never change the religion they have been brought up in; bad men change for money, or to get praise. Is there not good in every religion? Is not your 'Charity covereth a multitude of sins,' and your 'Love your neighbour as yourself,' good religion, think you? Why should you give it up then? Our good books would only tell you to do the same. And then a man who changes once, why shouldn't he change again for money? Christians are very clever in business, you know, but they don't care for religion—they like to make much money—except, perhaps, some of the missionary Christians, who, though I don't know any, I am told are very good." "Don't Parsees care for money?" I ask. "Yes, of course," is the prompt reply; "but *they* do all that their religion tells them. We believe, sir, in the ONE GOD, and we regard all fire as an emblem of Him. It is therefore against my religion to waste fire. No good Parsee smokes, for instance, because lighting a cigar wastes some of what we consider is an emblem of God. No, sir, we do not worship fire, except as an emblem. Yes, I can read all the prayers in my book. Understand them all? No; I understand some of them, and I read all. What good is it to me, do you say, to read what I don't understand? Sir, it's my religion. If I do what that tells me to do, I shall go to heaven; if I don't——" Here Sorabjee paused, and admitted that he had not studied the result of a contingency which he had never contemplated as possible. He does not eat beef, not precisely from religious motives, but because "our fathers, the Parsees who came first to India, promised that, if they were allowed to stay, they would never kill or eat the sacred animal of the Hindoos;" but his answer to other questions concerning his habits is simply, "It's my religion;" and his creed, when summed up, appears to be—"My life is governed by certain rules which suit me perfectly, but which one of your strange unaccountable race could neither submit to nor comprehend. I should as soon think of asking a wild animal to share my religious belief as an Englishman; so let us each go our own way, believing that if we do our duty in our several walks we shall be taken care of at last." This combination of indifferent optimism with a scrupulous observance of external forms, must be a terrible barrier to missionary effort. "Your religion is good for you," probably, say the people of whom Sorabjee is a type, "so keep it; but for our own faith, we neither wish to vaunt its excellence, nor are capable of arguing upon it. We take it upon trust." To men with whom the external ordinances of religion, the prostrations in public, the ablutions, and the turning towards the sun, are all in all, Christian privacy is altogether unaccountable; and the shrewd and damaging implication of the Cairo donkey-boy is echoed in spirit by many varieties of Indian orthodoxy: "Take my donkey, master; him very good donkey, sir! Try him, master; him Christian donkey—*he never go down on his knees!*"

Sorabjee is very contemptuous when I ask him if he puts all religious outsiders on the same footing—whether, for example, he ranks Christians with Hindoos. "Hindoos—whew! why they are idol-worshippers! They don't believe in the one God; and, as a brother freemason, you know, sir, that we could not admit them into our order. Zoroaster, whose picture in gold is on my little book of prayers, was a great freemason, and the Parsee lodges are among the best (for working, you understand) in India. But Hindoos! why, when they asked to be made freemasons too, they were refused. Idol-worshippers, and those who don't believe in the one God, can't be freemasons, and are quite different in our eyes to Mohammedans and Christians." I should add that Sorabjee is a slow thinker and deliberate speaker, weighing each word before it is delivered. He is, moreover, scrupulously and imperturbably courteous. "Do you want me to dance a war-dance round you?" shouted an irritable Englishman the other day, in despair at his failure to make his instructions understood. "No, sir, thank you, I'm much obliged," answered the Parsee, politely, touching his forehead at the same time in gratitude for the offer.

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The paying-out has gone on regularly; and at noon we were in latitude 16° 6′ 54″, longitude 60° 33′ 0″, and had run 726 miles, and paid out 804 miles of cable, or 10.78 per cent of slack. The thermometer stood at 82° air, 76° water. Wind, N.E.

21*st February.*—At seven this morning the change from the aft to the middle or main tank was made, with the same precautions and the same success as before, Captain Halpin superintending personally, and the whole staff on duty. The cable hands in the aft-tank cheered lustily as the bight passed safely upwards and pursued its course along the trough. This is the last change, and the paying-out between here and the buoying-place at Aden will all be from the main tank, which, as its little knot of constant admirers are never tired of saying, "is sixteen feet more in diameter than the ring at Astley's." Each layer of cable here is seven miles and a quarter long. At tiffin the word was passed "that 1000 miles of cable would have been paid out before we rose from table;" and we once more congratulated each other on the unbroken good fortune of the expedition. The Chiltern crept quite close to us after dark, and some signals were interchanged by means of the flashing lights and the Morse code. There has been less air during the last twenty-four hours, and the sea has presented a dull flat level, which, however excellent for cable-laying, lacks the vivacious brightness of its mood on preceding days. At noon we were in latitude 15° 37′ 32″, longitude 58° 21′ 45″; had run 857 miles from Bombay, and paid out 952 miles of cable or 11.14 per cent of slack. Thermometer—79 air, 76½ water. Barometer, 30.90. Wind, N.E.

22*d* *February*.—The news of "a light on the starboard bow" brought every one on deck from dinner; and when two rockets and a blue-light were burnt from the approaching ship, it was pronounced confidently to be the P. and O. mail-steamer on its way to Bombay. So quietly uneventful has our voyage been, that meeting a ship was quite a welcome excitement; and when Captain Halpin ordered rockets to be fired, and blue-lights burnt at the stern, bows, and paddle of the Great Eastern, so that our P. and O. friends might be able to estimate her proportions—perhaps see the cable going out—the liveliest interest was felt. There was no moon, but the stars shone their brightest, and the cabin-lights and general outline of the passing steamer could be seen clearly. It was pleasant to hear the hearty cheers of those on board her come echoing over the sea; pleasant to think of the good feeling they expressed; pleasant to picture to one's self the scene on the roomy comfortable quarter-deck—ladies asking questions, gentlemen and officers explaining, and securing them advantageous points of view, and to know of the welcome break our appearance and recognition were making in the evening's routine. The Great Eastern and the enterprise she was engaged in would make a grateful topic over this evening's grog; and the outward bound would, one likes to think, take heart, and find the evils of expatriation modified by reason of the link between their adopted country and home, of which the gigantic presence before them spoke. Such incidents are precious at sea; and our talk ran on personal experiences of the P. and O. steamers, and their merits and demerits; on the unfailing courtesy of their officers, the comfort of their cabins, the quality of their wine, the extreme substantiality of their viands, the pleasant cultivated society invariably to be met on board them, the prospects of their shareholders, and the effect of the Suez Canal upon their dividends,—until long after the blue lights and rockets of the passing steamer had gone by the responsive Chiltern, and it had disappeared into the black night. The cable continues in perfect order. At noon to-day we were in latitude 15° 0′ 44″, longitude 55° 49′ 0″; had run 1009 miles, and paid 1111 miles of cable, or 10.1 per cent of slack. Thermometer —78 air, 75½ water. Barometer, 29.95.

23d February.—Yesterday and to-day have been the longest runs of the voyage, for the returns at noon give 152 miles in each 24 hours; making our total distance from the Bombay splice, 1161 miles—1272 miles of cable laid out, or 9.61 per cent of slack. At this rate we shall be off Aden on Saturday evening, and land the shore end at daybreak on Sunday morning. At noon to-day we were in lat. 14° 27′ 0″, long. 53° 15′ 0″. Thermometer—80 air, 76 water. Barometer, 29.90. At one P.M., all brakes were taken off the machinery for the first time since the start, and the cable allowed to pay itself out as freely as it would. Curiously enough, it is doing so without marking the slightest strain, and doubts begin to be expressed as to the correctness of the soundings given on the Admiralty chart, for the mere weight of the cable going down, would, it is argued, make some mark on the dynamometer. All is wonderfully still, and the expanse of waters round us is, save where the Great Eastern ploughs them up, motionless as those of the Dead Sea. Intelligence of our having met the P. and O. steamer last night was included in the noon message to Bombay.

Thursday, 24*th February*.—Another long run of 157 miles since yesterday. The Chiltern took soundings this afternoon, to ascertain how far the Admiralty chart is correct, and signalled 1075, instead of 1290 fathoms as recorded. It is now maintained that the Great Eastern has had the good fortune to fall in with a current in her favour, and that to this current our unexpectedly rapid progress is due. The sea continues to present a smooth and sluggish surface, much as if oil had been emptied on it; and though the sky is clear, the atmosphere is heavy and close, giving us a taste of what we may expect on the Red Sea. There is nothing but good news from the testing-room, and all on board are in high spirits, for our progress is swifter than even the most sanguine hoped for. We were in lat. 13° 57′ 36″, and long. 50° 37′ 0″, at noon; the total distance run being 1318 miles, and the total cable paid out, 1434 miles, or 162 miles since yesterday. The thermometer stands at 84 air, and 76 water; the barometer at 29.89. Wind, S.S.E.

25th February.—It was almost comic to note the chagrin and disappointment visible on all faces when the figures resulting from the noon observations were announced at tiffin. We must surely have been spoiled by our unbroken success, to find a grievance in the fact that we have steamed beyond the current which has been favouring us for the last three days, and have met with one which retards our progress. The news that we have only come 127 miles since yesterday was received with indignant incredulity; and some hardy theorists presumed to hint—in dark corners, and as conspirators who would speak disrespectfully of the equator, or scandal of Queen Elizabeth—that there may be some mistake in the calculations. But this presumptuous hope soon died out, and then that the ship has come thirty miles less in the twenty-four hours than she did yesterday, was admitted as a vexatious but indisputable truth. There is nothing wonderful in it. Our course runs in the teeth of a strong current, instead of in its direction—that is all; and we shall still, in spite of recent slowness, be at "Position B," thirty miles off Aden, by Saturday, and before midnight. There the splice between the deep-sea line running to Bombay, and the stout intermediate cable which is to join the Aden shore end, will be made. The chief annoyance is, that we shall probably miss the mail-steamers both for England and Bombay; and that our friends at both places will have to wait another week for the detailed news of our success. Yet this is but a small matter; and, as one of our little party remarked pertinently at luncheon, while the news of the short run was fresh, "if we show disappointment at anything so unimportant as this, what philosophy should we have in the event of serious disaster?" ' At two P.M. Captain Halpin signalled the Chiltern to come alongside, and when within speaking distance, requested Captain Edington to steam ahead of us, to mark the situation of "Position B" by observations, and to lie-to by it, sending up rockets and blue-lights every hour after eight to-morrow evening. Four hours later, the Chiltern was still in sight, a black speck between us and the horizon, and having for a background a magnificent expanse of golden sky, the sunset being one of the grandest I have seen in the East. The Great Eastern must surely be going faster than yesterday, or her consort would have disappeared before this; and it would not astonish me if we found to-morrow that the opposing current had been coped with successfully by the ship's engineer and his merry men below. On going on deck at six P.M., the mountains of the Arabian coast were clearly visible on the starboard side, and looked in outline and colour like a group of heavy clouds which had been turned into stone. At noon we were in lat. 13° 0′ 15″, long. 48° 31′ 30″; had run a total distance of 1445 miles, and paid out 1584 miles of cable. The thermometer was at 83 air, and 77 water; barometer, 27.82; with an extremely variable wind.

26th February.—My surmise of yesterday was correct, for we have once more made the coveted distance of one hundred and fifty-seven miles, and it is hoped that we shall reach "Position B" before dark. The coast-line has disappeared, and the sea and wind are fresher than either has been since we left Bombay. We have all been on the look-out for the P. and O. steamer, which is due at Aden to-day or to-morrow, but have failed in seeing her hitherto; and speculation runs high as to whether or not we shall have an opportunity of despatching letters to England by the out-going mail. If the P. and O. authorities knew the great ship was so near, they might perhaps, we think, stretch a point and wait an hour or two for the sake of hearing of our success. One part of the peninsula of Aden, the mountain Jibbel Sham Shan, from the summit of which a constant look-out is kept for the incoming mails, could be just seen from the deck this afternoon, faintly showing against the horizon, and misty and dim. The variations in our speed have caused corresponding fluctuations in the slack or spare cable paid out, for all brakes were taken off it on Wednesday the 24th at one P.M., and the line was allowed to pay itself out freely at its own pace. This was, as it turned out, but very little quicker than the speed at which the ship was going until she met the opposing current. The dynamometer marked no strain whatever, and the returns showed that from five P.M. on the 24th, to seven A.M. on the 25th, the amount of slack varied from 7.3 per cent to 22.8 per cent. It is worth stating that we attribute much of our undeviating success to a simple improvement in manufacture, which will probably be quoted hereafter as the final conqueror of the one formidable enemy to deep-sea cable-laying which had been left unvanquished. Every one remembers the frustration and anxiety caused by the bits of broken wire found sticking in the Atlantic cable of 1865; and how the successful expedition of 1866 was mortified and delayed on the eve of its second triumphant entry to Heart's Content by the discovery of a fault arising from the same cause. The hardships and difficulties attending the laying of the French Atlantic cable are less familiar to the public, whose curiosity had been naturally allayed by the established success of the Atlantic lines already working. Those engaged in that expedition, however, speak seriously of dangers and casualties, on the side of which the very elements appeared to have arrayed themselves, and in the course of which "faults" were developed just when wind and weather combined to make the operations of cutting and buoying most critical. When, therefore, it was determined to make such a length of cable as would stretch from Aden to Bombay, it was also decided to try an experiment which it was hoped would prevent any errant piece of wire breaking off and causing the old disasters and delay. This experiment consisted in winding spirally round the cable after its completion strands of yarn in opposite directions, and then passing the whole through the mixture known as Clark's compound, as previously described. This, it was held, would keep the stray wires, if any, in their place, and prevent them inflicting injury upon the cable. The result has been eminently satisfactory, and the remarkable feature of the voyage has hitherto been the absence of mischance.

There have been some severe cases of heat-apoplexy among the firemen, but none have ended seriously, and the general health of the ship is good. Mr Allchin reports favourably this morning of all the patients under his care.

At noon we were in lat. 12° 47′, long. 45° 53′ 0″; had run a total distance of 1602 miles, with a total of 1749 miles of cable paid out, or with 9.62 per cent of slack on the whole distance. The thermometer stood at 82 air, and 76½ water; barometer, 29.86; wind, E.

Off Aden, Sunday, 27th February.—We joined the Chiltern at "Position B," at a quarter to six P.M. yesterday, when the splice was at once proceeded with on the Great Eastern's deck. This occupied two and a half hours, during which the ship was kept with stern to cable, a by no means easy matter, for wind and currents were adverse and strong. Paying-out was recommenced at a quarter past eight P.M., and at half an hour after midnight the cable was cut and buoyed in forty-fathom water, and eight miles from Aden. We are now (six A.M.) in a gale of wind, and a sea which is running far too high for shore-end laying. There are some misgivings as to whether the darkness and the heavy sea have not interfered with the success of the buoying, but this cannot be ascertained with certainty until the weather moderates.

CHAPTER V.

AT ADEN.

27th February.—The frowning mountains of Aden looked quite familiar as we drew near them in the early morning, and we had the mortification of seeing the mail-steamer for England go on its way about an hour before we anchored. In vain had all on board hastily closed up their letters for home. The rough weather and the contrary currents proved too much for us, and there would be no sending off detailed news of the Expedition for another week. It was very mortifying, but there was no help for it, and parties were soon formed for shore. The post-office, with its stores of pleasure and pain, of anxiety and of ease, some of which had been waiting for us for weeks, was made for first, and then the famous tanks, the cantonments, and the Isthmus Position were explored.

The American who said if he held property both in the place unmentionable to ears polite, and in Aden, that he "should part with his Aden holding, and live in Hades for choice," was guilty of a coarse exaggeration of the tone in which it is the fashion to speak of this well-abused corner of the world. It was pleasant, therefore, to hear at the mess-table of the 7th Royal Fusileers, the officers of that fine regiment declare that they consider the station maligned; and that, coming as they did last from the interior of India, they were agreeably surprised at the smallness of Aden's demerits. To me, it seems to contain within its narrow limits many features of Eastern life which belong equally to Egypt, to Palestine, and to Bengal. Here are seen the races of the one, the stony desolation of the other, and the unfailing signs of the British domination of the third. In its mingled native population the Arab element is very marked, both men and women being of the type you meet in Egypt, and far more muscular and strong than those seen after landing in India. Here, too, you are amused by thinking you are able to trace to its source the strange custom which was so common among the fashionable ladies of Paris and London a few years since, that of dyeing dark hair auburn and yellow. The half-naked black men you meet nearly all wear ringlets, which are burnt to a bright red. Here and there you see a head which has been apparently whitewashed, and this, you are told, is the preparatory stage of the dyeing. In these cases the hair is plastered down as if with a white lather which has become congealed, and the patient, after remaining for weeks in this condition, has the lime plaster removed by skilled hands, and is as red-haired, and rejoices in as stiff corkscrew curls, as his neighbours and friends. Insecticide is vaunted as one of the collateral advantages of the process. The Somaulees are a bright people, whose animation and activity seem remarkable after the languor of the Indian races. The men wear ribbon or string necklaces, fastened by enormous lumps of yellow amber; the women are powerfully built, and by their custom and mode of carrying heavy weights, develop their figures dorsally to a surprising degree. The long lines of camels walking in single file, and carrying, besides the naked black figures of their Arab drivers, heavy loads of produce from the mainland of Arabia, recall Egypt too; while, if you ascend any elevated position, and look over the arid expanse around, it is as if the interior of an extinct volcano were before you. There are many Jews, too, among are accustomed to call the Jewish cast of countenance. Many of them are fair, with large blue melancholy eyes, and a plaintive expression on their well-cut features; and all wear the long front ringlets of the Pharisaic sect.

At Aden, the outward-bound traveller first sees a genuine Indian bungalow, and learns how keenly space and air are prized by English dwellers in hot latitudes. There have been strong winds blowing at night upon each of my visits to this strange spot, and the entire absence of windows in the houses of the friends who gave me hospitable shelter, and the way in which the wind has moaned, and shrieked, and whistled through the Venetian blinds, are among my most lively remembrances. But airy as these bedchambers seemed to me, they are deserted by residents for something airier still in the hot weather. Perched on the highest point near the bungalow is often a square summer-house of reeds and matting, or native wicker-work. It is generally without other furniture than an iron bedstead, and is open all round and all over, and can be seen through like a bird-cage. This constitutes its merits as a sleeping-place, when a house, however well ventilated, would be insupportable; for the faintest puff of air from any quarter is caught—and the bird-cage means comfort, just as well-drawn curtains and a blazing hearth do in colder climes.

Marco Polo, writing in 1258, says: "Aden has the advantage of an excellent port frequented by ships arriving from India with spices and drugs. The merchants who purchase them with the intention of conveying them to Alexandria, unlade them from the ships in which they were imported, and distribute the cargoes on board of other smaller vessels or barks, with which they navigate a gulf of the sea for twenty days." . . . "In this port, Aden," continues the old Venetian traveller, "the merchants ship a great number of Arabian horses, which they carry for sale to all the kingdoms and islands of India, obtaining high prices and making large profits." It is not as a commercial port that Aden is thought of now, though the trade with the mainland is said to be a growing one; and the success of the Suez Canal is certain to add to its importance. To the P. and O. passenger it is a welcome stopping-place; a mart for the purchase of genuine Arabian ostrich-feathers; a popular driving-ground, where a camp and fortifications, and ancient reservoirs, of the same character as Solomon's Pools near Bethlehem, but smaller, are to be visited while the steamer takes in coal and water. To the soldier, it is one of the hottest and least popular of stations; to the statesman, it is a key to the East, which is valued in proportion to the envy its possession by England is thought to cause; and to the electrician, it will be henceforth familiar as the mid-station of one of the longest and most important submarine lines in the world. It is hot, arid, and destitute of soil. A heavy fall once in eighteen months or two years, is all the rain it knows; and if it were fair to generalise from individual experience, I should describe the effect of its atmosphere upon the mind to be highly depressing. My friend Lieutenant-Colonel T. W. Marten, whom I find in command of the Isthmus Position, hospitably insists on my not rejoining the Great Eastern to-day; and after a thoroughly pleasant evening, I sleep at his bungalow, to be roused next morning from confused dreams of high winds, tempestuous seas, and fractured cables, by an orderly reporting sonorously at my ground-floor window, "ONE PRISONER, sir!" an announcement which tells me that my kind host has vacated his own chamber for my use, and recalls me from the Forces of ocean to those of earth.

Much business has been transacted to-day between Captain Halpin and the Parsee agent of the

Telegraph Construction and Maintenance Company, who provides native labourers for the digging of trenches, and other necessary preparatory work connected with the telegraphic establishment here; and we hear on all sides that, with the wind in its present quarter, it will blow hard for three days, and that there is no chance of the Great Eastern resuming her work until that time has passed.

28*th February.*—Too rough for shore-end laying to-day; and as the circumstances under which the cable was cut and buoyed were such as to cause some anxiety, Captain Halpin went on board the Chiltern and proceeded in her to the buoys. On picking these up it was found that the cable had parted from both of them, and that its sealed end was lying at the bottom of the ocean. It will be remembered that the sea was rough, and the night dark, when the cutting and buoying took place. The buoy, too, with the cable attached to it, was struck so violently by a heavy sea just as it reached the water, that it was dashed completely through the square aperture at the ship's stern, known as the screw-well. Its chain fouled in such a way that for some minutes the full strain of the ship was on the mushroom anchor, a strain which it was impossible to ease by pulling in or paying out. This buoy was fastened about 200 fathoms from the cable's end, such end being attached to another buoy. When the Chiltern arrived alongside these two buoys at half-past eleven this morning, and it was found that the cable had broken adrift from both, the grapnel was lowered, and the Chiltern made to steam to the south and finally to the east, in the direction the cable was known to lie. For six hours the dynamometer made no sign, and we knew that the grapnel was passing harmlessly over the soft ooze, mud, and small shells which our soundings gave as the bottom. At twenty-five minutes past six P.M. the strain on the dynamometer told us the cable was caught, and in twenty minutes more a loop of it was at the ship's bows, two miles from the end originally buoyed. Another buoy with mushroom anchor was attached to the loop, a buoy with flag being let down as well to mark the spot. The sea was too rough to make it safe to do more that night, and the Chiltern rejoined the Great Eastern at nine P.M.

Mr de Sauty, whom I last saw in the Great Eastern in 1865, when he was the electrician of the Atlantic Telegraph, is, I find, the chief of the British-Indian Telegraph Company's staff here;

and I found him very busy superintending and directing while instruments were being fixed, on calling at the Company's offices this afternoon. All passengers landing from the steamers which call at Aden from India and Europe every few days, will pass the new telegraph office, for it is under the same roof as the well-known Parsee store, and on the highroad to the Isthmus Position, the cantonments, and the tanks.

1*st March.*—This morning, at half-past six, Captain Halpin went in the Chiltern to pick up the buoys, and the cable was then cut at the loop, and tests applied, when the line to Bombay was found to be electrically perfect. The end was then sealed and buoyed, and the remaining two miles were picked up and taken on board as spare cable. Preparations for landing the shore end were made on the Great Eastern during the morning, and the work was proceeded with directly the Chiltern returned. The barge into which it had been paid was towed to a little bay in which a temporary cable-house has been erected close to the structure put up for the old Red Sea cable years ago.

The scene at the landing was of a totally different character to that at Bombay. Aden, as I have endeavoured to show, is a huge cinder. Its lofty volcanic ranges are of a dead red colour, like bricks which have been overbaked, and in the whole place there is neither leaf nor shrub to break the terrible sterility. Rising abruptly from the water, these jagged mountains stand out in a thousand fantastic shapes, as if a raging sea of lava had, while at its wildest, been suddenly bidden to stand still and petrify. At the foot of these, as seen from the sea, the houses of Steamer Point gleam in the fierce sun; while from the cable-house to the water's edge a line of busy and almost naked figures, with complexions of jet black, are scooping out a trench in the hot sand. "Tindals," or foremen, whose dress is more elaborate, but is strangely selected—for it consists of a shirt, a turban, an unbuttoned waistcoat, and nothing else—urge them on with shrieks and blows; and Arabian Jews, in ragged robes and worked skull-caps, British officers in white undress, and two or three long-robed Parsee merchants, make up an animated throng. The heat was terrible, and one envied the sailors and cable hands, whose duty it was to jump from the barge into the sea, and so bring the end on shore and into the testing-room.

2*d March.*—Aden is an explosive place, with guns going off at all hours, and to announce various things, from sunrise in camp to the sighting a steamer from England or India from the watch-box on the lofty peak of Sham Shan. It has rarely heard, however, more important salutes than were fired by the Chiltern and the Great Eastern soon after eleven this morning, for they announced the completion of the splice between the sea line and the shore end, and that the two stations of Aden and Bombay were at last united. Messages of congratulations were sent through to Lord Mayo and Sir Seymour Fitzgerald, and arrangements commenced for laying the shore end of the Suez section.

We have no news of the Hibernia, which ship, we hear, left England on the 30th December, with 600 miles of the Red Sea cable on board; and as she will have to take in coal at Aden before she can come on her way, Captain Halpin has determined to lay the 350 miles of Red Sea cable he has on the Great Eastern, and then to splice on with the length which is on board the Chiltern, and to lay that. By this means additional delay will be avoided, for the Great Eastern will return to Aden directly her portion of the work is over, and can be taking in coal while the Chiltern is paying out. The time of the Hibernia's arrival is held to be uncertain, and if she has met with bad weather, she may not be here for weeks. The communication between the cable-house and the Aden offices of the British Indian Company, a distance of three-fourths of a mile, is by a land-line carried along a trench which runs from the bay to the latter. This land-line was laid on Monday night, the black-skinned, burnt-haired labourers shouting and singing with even more vehemence than the coolies at Bombay, but now and again refusing to work, hiding themselves childishly in holes and behind stones, and in several cases running away. These men, who were more playful than vicious, were provided by Mr Cowasjee, the Parsee merchant already alluded to as the Aden agent of the Telegraph Construction Company, who had himself engaged them through their "Tindals" or gangers. These last used the stick freely on the backs of the recalcitrants, who took this form of admonition quite as a matter of course, shrugging their sturdy ebony shoulders, and setting to work again with a will. At opposite sides of the trench they formed, the two short land-lines, one for the Red Sea section, and the other completing the Bombay and Aden line, were laid, a distance of three feet being maintained between the two to prevent the possibility of confusion when repairs are necessary.

The Chiltern landed the shore end of the Suez section this afternoon, and after it had been taken safely into the testing-room, she anchored about three-quarters of a mile off. To-morrow morning early, the remainder of the shore end will be laid, and the splice made ten miles off, between it and the cable on board the Great Eastern, after which paying-out will go on from the latter. Care was of course taken this afternoon to keep the Red Sea shore end clear of the buoy-flags marking the course of the Bombay one, and there will be no difficulty about picking up either of them for repairs. We are off early in the morning for the Red Sea, and are advised that communication, otherwise than electrical, between the Great Eastern and the shore will not be practicable after seven A.M., when the last boat will leave with letters. Captain Halpin gave instructions to the ship's engineers this evening to have steam up and all in readiness for to-morrow's start.

3*d March.* — Our plans are suddenly and pleasantly altered. Half an hour after we had sent off our letters for England, and last messages to friends on shore, the word went round that the Hibernia was in sight. The news seemed too good to be true. Signals were interchanged, however, and in a few seconds the Great Eastern's guns announced to all whom it might concern that a third vessel belonging to the Expedition was about to take up her position off Aden. The importance of this arrival at this time is very great, for it obviates the necessity of the electricians and cable hands returning here, as the Great Eastern, the Chiltern, and the Hibernia will now start together up the Red Sea directly the latter has coaled, and Captain Halpin and the working staff will be able to pass from ship to ship until the Dædalus lighthouse is reached, 350 miles from Suez. If the William Cory and the Hawk meet us there, as we hope, with the news that they have laid that section of the cable, the whole line will be finished by splicing the two lengths. It is evidently unsafe to prophesy as to the date at which the ships of the Expedition will arrive at their several ports, for they have a knack of keeping their time which baffles the anticipations of the most experienced. The arrival of the Hibernia was as the arrival of the Great Eastern at Bombay a month ago. In both cases it was demonstrated that the probabilities were in favour of a considerable delay; and I was told on high authority only last night, that it would be at least ten days before we returned to Aden, and that it might easily happen that the Hibernia would not have arrived even then. We hope now that the work will be finished and those connected with it be on their way to England about the time that, according to the theories of those who believed the Hibernia would be late, the Expedition would have been leaving Aden for the second time. The ballasting and coaling the Hibernia will occupy a couple of days, and we shall start on our way on Sunday morning.

Captain Halpin and staff went on board the Hibernia soon after she anchored, and after comparing notes with and giving instructions to her commander, Captain Welch, proceeded to the Chiltern with the intention of laying the remainder of the Red Sea shore end, which was landed yesterday. The Chiltern was three-quarters of a mile from the cable-house, and had been under way and paying out about ten minutes, when a foul flake came up out of the tank. *Absit omen!* This is the first of these very common sources of disaster we have met with in this Expedition, and was about as disagreeable an illustration of their power for evil as the most malevolent could desire. This shore end is thick and clumsy after its kind, and its coiling in the Chiltern's tank presented a striking contrast to the symmetrical and orderly arrangement of the cables carried in the Great Eastern, being irregular, untidy, and, as results showed, unsafe. Instead of passing peacefully upwards, the outgoing bight caught two of its fellows, and in an instant the three were twisted together in an inextricable knot. The stout coil, which is of treble the diameter of the deep-sea cable, and is scarcely more flexible than a kitchen-poker, overlapped and entangled itself with as much fatal facility as a ravelled skein of silk. The ship, which was not steaming at more than four knots an hour, had her engines reversed immediately, and the whole paraphernalia of breaks and stoppers were applied. But the evil was irremediable, and the massive and ugly knot forced its way upwards—slowly, it is true, but resistlessly, and tearing away in its progress the " bell mouth" and part of the wooden framework leading from the tank to the trough. This was done in a few seconds, and the report from the testing-room of loss of continuity came at the same moment. There was nothing for it but to cut out the foul flake and resplice the two ends of cable from which it was taken. This occupied rather more than an hour, after which the electrician's tests were found to give a very curious result. The nine miles of shore end in the tank were in perfect condition, but in the three-quarters of a mile lying under the sea between the ship and the cable-house there was a total loss of insulation. I pass by the exclamations of astonishment and incredulity which arose, for it seemed incredible that anything could have happened to the short length, the end of which was, as we supposed, lying quietly on a testing-table we could almost see. It was insisted that there must be some mistake; and tests were about to be taken again, when a boat from shore brought the startling intelligence that the cable had been dragged out of the house by the action of the ship, when the latter was stopped and turned by reason of the foul flake. The electrician in charge at the hut had recorded the circumstance gravely in his diary thus: "At five minutes past eight A.M. (Greenwich), the cable suddenly disappeared through aperture, and has not been seen since." Here was quite a novel casualty in shore-end laying. No wonder the tests returned "dead earth," for the sensitive wire was exposed and in the sand. The incident was more comic than serious, and it certainly said something for the strength of the cable that a ship moving three-quarters of a mile off could have dragged it thus through the sand without injuring it. A boat-load of men was at once sent on shore; and there, by digging three feet deep into the sand and towards the sea, they discovered the missing end sixty feet from its late resting-place. Had it been fastened to anything in the hut, the fragile structure would assuredly have been pulled down, and the delicate instruments in it have been irremediably damaged. As it was, there was no worse consequence than a short delay. It was of course impossible to pull the end back again, so it was carefully sealed and once more covered with sand. A splice will be made subsequently between it and the house—an easy matter.

The Chiltern now steamed out to sea at the rate of four miles an hour, again keeping clear of the buoy-flags marking the whereabouts of the Bombay cable; and after buoying this, the Red Sea shore end, successfully, nine miles on the way to Suez, returned to her position by the Great Eastern at nine P.M. The weather was fortunately most favourable; and the brightness of the new moon which rose from behind the lofty mountains of Arabia some time before the work was over, promised well, men said, for our cable-laying in the Red Sea.

4th March.—Captain Halpin and Mr Laws have been busy all day on board the Hibernia, arranging for the future transfer of the staff, securing a proper temperature for the testing-room, and settling with Captain Welch the thousand and one minute details upon which success depends. I wish the people who talk glibly of electric-cable laying as a comparatively easy matter, could see and appreciate the evidences of anxiety and care which come before me every day. The longer I am with the Expedition, and the more I become acquainted with its inner life, the stronger is the conviction that the difficulties always lurking in the background are under-estimated at home; and I cannot resist the feeling that sooner or later, through change of means or hasty alteration in mode or material, some gigantic *fiasco* and total loss will acquaint the world that submarine-cable laying in deep water is by no means a thing of course.

The Hibernia is busy taking in coals and ballast; and as three cable-ships are now lying off Aden, Mr Allchin, Mr Beckwith, Mr Paterson Saunders—a Calcutta gentleman, who received the written thanks of her Majesty and an estate valued at £10,000 from the Indian Government in acknowledgment of his patriotic and valiant services during the Mutiny—and myself, agree to ascend the peak of Jibbel Sham Shan for the sake of viewing the telegraphic squadron lying at its feet. This mountain is some 1800 feet high, or almost five times as lofty as Shakespeare's Cliff at Dover, and the exertion of going up it can only be attempted by Europeans in the cool weather, and then only in the early morning or during the night.

We left the Great Eastern soon after half-past five A.M., and were taken swiftly to shore in her steam-launch, landing just as the grey shades and half-lights of morning enabled us to distinguish between men and rocks; for a large number of the natives of Aden sleep in the open air, and the lumps of white and brown coiled on the roads and in the holes and crevices of its rough natural walks, resolve themselves into devout Mussulmans who pass down gravely to the water's edge to wash, and who go through the rites of bowing their turbaned heads till they touch the ground, of prostrating themselves at full length, and of moving lips and bodies in prayer, unconscious or indifferent to all but the duty in hand. There are four miles between our landing-place and the foot of the mountain, and we drive over these and then commence the ascent on foot. It is fatiguing but not difficult, there being a road or steps all the way. The summit is some twenty feet square, and is gained by a precipitous range of steps cut out of the solid rock. The view from it is indescribable. All the striking and exceptional qualities of Aden stand out in bold relief; and it is as if the spectator were looking down upon an Inferno in which the fire has been permitted to die out. In the distance are the mountains of Arabia, dim, wild, and majestic, and between these and the desolate Aden ripples an ocean of unutterable blue. But at our feet and all round us are jagged peaks which the sun gilds only to make their barrenness more palpable, and which are unrelieved by any trace of animal or vegetable life. The Great Eastern, dwarfed to the size of her consorts, and the Hibernia and Chiltern converted in their turn into tiny toy ships, the boats of the fishermen and the tenders attached to the harbour, mere black dots on the water, speak of the elevation we have attained; but it is the ghastly, scorched-up rugosity, the utter silence of the stony expanse around, which impress one with a sense of dread. Some of the cinderous mountain-crags have strange shapes, as of stony fiends grinning at the intruders on their domain; others have the expression of a human face in pain; and others again are like unnatural animals, or rude heraldic devices, distorted and turned into rock. It is an awesome place. Happily the man who spends his life in the crow's nest up here, and whose constant task it is to watch for steamers, and to let off guns and hoist signals at their approach, is a native; for the daily contemplation of such a view is enough to turn a European brain.

A long and narrow strip of sand, washed by the sea on each side, constitutes the boundary between Aden and Arabia, just as the famous neutral ground does between Gibraltar and Spain; and the smiling beauty of the sea, and the brightness of the yellow sands, make the harshness of the burnt-up rock they encircle the more impressive.

As we gaze down, a solitary vulture circles round and round, as if eager for human flesh; while below, in a hollow which has apparently been scooped out of the hot rock, we see the crater of the extinct volcano; rows of white barracks, looking from this height like children's toys; the cluster of flat-roofed houses forming the town; and the long lines of military fortification—slender streaks of white on a black background—which make the place practically impregnable.

Until this morning I thought that the view from Herod's unhonoured burial-place on the summit of the Frank Mountain, extending over the wilderness of Judea, and towards the cave of Adullam—or that on the Egyptian desert by the Pyramids of Sakkara, where it is strewed with dead men's bones and mummy-cloths—was the most depressing in the world; but now, having seen and pondered over all three, I give the palm to Aden, and recommend it unhesitatingly to the Mark Tapleys whose animal spirits are too high, and whose mental elasticity and cheerfulness need to be reduced. It has lovely views, and is full of the combinations of bright rich colour, dear to the artist. But, all sunny though it be, the sea-washed rock called Aden is a gloomy conjunction of the menacing and the sublime.

5th March.—Mr Forde, after some days' testing, gave his certificate to-day to Captain Halpin, that the section between Bombay and Aden is a cable electrically perfect and properly laid, so that it now passes from the hands of the Telegraph Construction Company into those of its permanent owners, the British-Indian Telegraph Company, and will be doubtless open to the public before many days. The following message came through to us on Saturday:—"The Viceroy, Calcutta, to Captain Halpin, Great Eastern: I am heartily glad to hear of the successful laying of the cable to Aden, and I congratulate the Company on their success." We had also this welcome budget of political and other news, which was at once published by being posted in a conspicuous position on the deck:—

"BRITISH-INDIAN CABLE.

"ADEN, 5*th March*.

"TRANS MESSAGE.

"Derby declined invitation — Conservative Peers assume leadership—Duke Richmond accepted it — Ironclad Abyssinia launched successfully—Disraeli convalescent—Bright improving—Dowse re-elected for Londonderry—Beresford elected Southwark—Bernal Osborne elected Waterford — Heron elected Tipperary — Gladstone's Irish Land Bill generally approved.

"Bishop Chichester dead—Bishop of St Asaph resigned — American corvette Oneida collision with P. and O. steamer Bombay, a few miles off Yokohama; Oneida sank immediately, 120 men drowned — Prince of Wales, examined in Mordaunt case; emphatically denied imputation of any immorality with Lady Mordaunt: verdict declares Lady Mordaunt insane now, and at time of citation."

—"*Received*, 9.50 A.M., *G. T.*; 12.52. P.M., *Local*."

This intelligence had been telegraphed from England through the land-lines to Bombay, and from thence to Aden through the cable; and as the mail came in from Suez on the same day, it was curious to compare the English newspapers of the latest dates (Feb. 18th) with our private telegraphic summary. In several instances, such as the introduction and favourable reception of Mr Gladstone's Irish Land Bill, the convalescence of Mr Disraeli and Mr Bright, and the defeat of the Liberal candidates for Southwark, the items were identical. In others, the cable, even with the land-lines as its source of information, was ahead of the journals. The evidence in the Mordaunt case was given, for instance, in the newspaper; and the verdict in the telegram, which also tells us of Earl Derby's having declined the invitation of the Conservative Peers to assume their leadership, and of the Duke of Richmond having accepted it. The cable message was of course sent through from Bombay in a few minutes; and thus, for the first, and probably for the last time, have the newspaper and the telegraph competed at Aden as to priority of news.

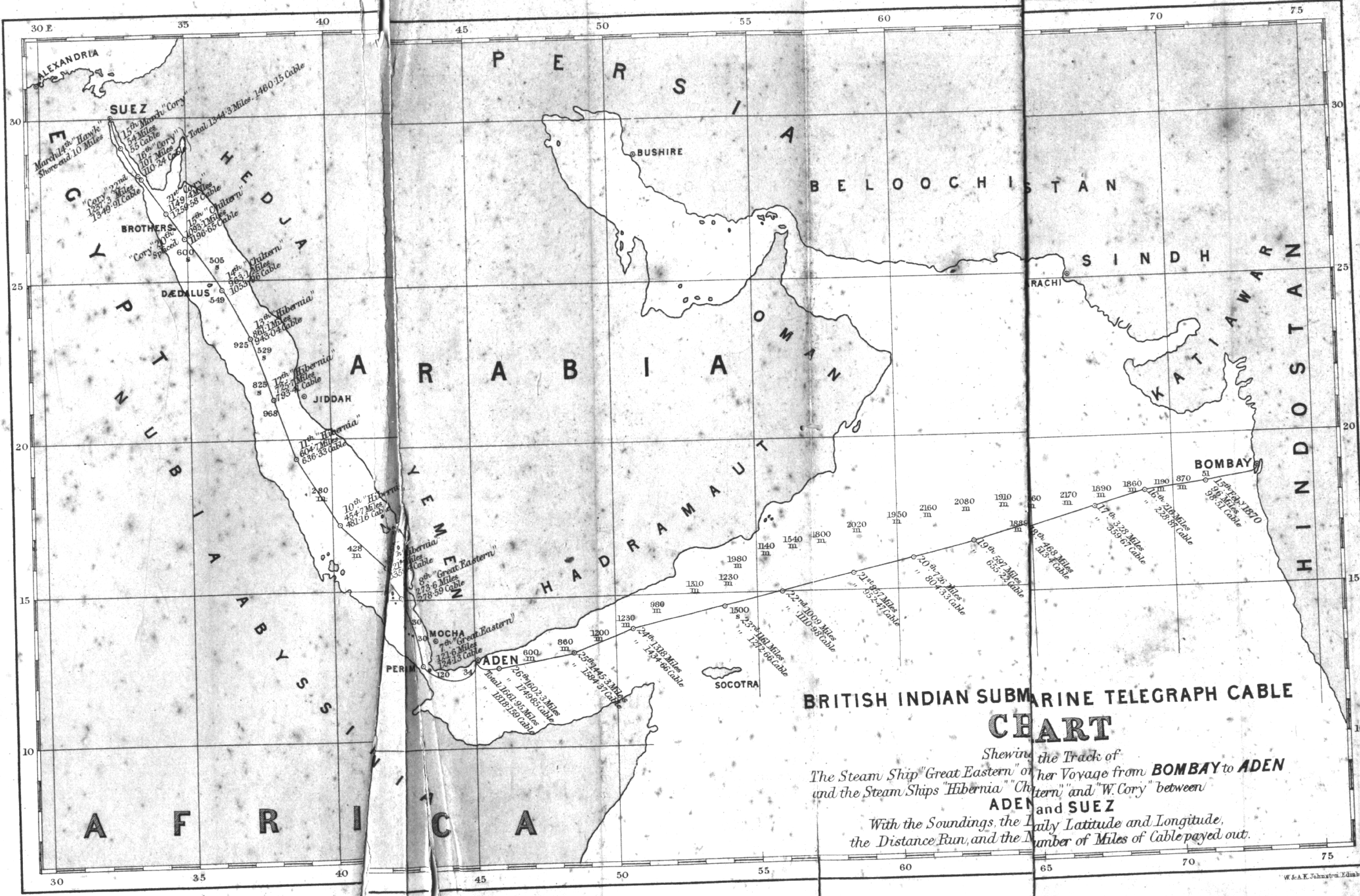
The Hibernia has taken in her coal, the three-quarters of a mile has been added to the shore end, removed so oddly by the Chiltern; and all is ready for resuming work to-morrow.

CHAPTER VI.

ON BOARD THE GREAT EASTERN IN THE RED SEA.

Sunday, 6th March.—The Chiltern was under way early this morning and proceeded to her position ten miles off, there to pick up the buoyed shore end and wait the arrival of the great ship and the Hibernia. The Great Eastern joined her soon after mid-day; and when the two ships were within a few hundred yards of each other, and it had been ascertained by signal that the end of the cable was on board the Chiltern, a rope from the latter was brought by a boat and fastened to the other end of the cable on the great ship. This end of the cable was then hauled in by the Chiltern and the splice proceeded with on her deck.

Before the buoy was picked up, the sharks and dolphins of these tropical seas appeared to take the liveliest interest in what was going on, swim-


ALEXANDRIA
SUEZ
BROTHERS
DÆDALUS
JIDDAH
MOCHA
PERIM
ADEN
SOCOTRA
BUSHIRE
KURRACHI
BOMBAY
PERSIA
BELOOCHISTAN
SINDH
KATIAWAR
HINDOSTAN
OMAN
HADRAMAUT
ARABIA
HEDJAZ
YEMEN
EGYPT
NUBIA
ABYSSINIA
AFRICA
March 14th "Hawk" Shore end 10 Miles
15th March "Cory" 54 Miles 55 Cable
16th "Cory" 107 Miles 110·24 Cable
Total 1344·3 Miles. 1460·15 Cable
"Cory" 22nd 1237·3 Miles 1349·91 Cable
21st "Cory" 1149·4 Miles 1259·58 Cable
"Cory" 20th Spliced
15th "Chiltern" 1093·1 Miles 1196·65 Cable
14th "Chiltern" 963·1 Miles 1053·06 Cable
12th "Hibernia" 861·1 Miles 943·04 Cable
12th "Hibernia" 725·7 Miles 793·4 Cable
11th "Hibernia" 604·7 Miles 636·33 Cable
10th "Hibernia" 434·7 Miles 481·16 Cable
8th "Great Eastern" 273·6 Miles 278·59 Cable
7th "Great Eastern" 121·6 Miles 124·13 Cable
26th 1602·3 Miles 1749·85 Cable
Total 1661·95 Miles 1818·159 Cable
25th 1445·3 Miles 1584·37 Cable
24th 1318 Miles 1434·66 Cable
23rd 1161 Miles 1272·66 Cable
22nd 1009 Miles 1110·98 Cable
21st 857 Miles 952·47 Cable
20th 726 Miles 804·33 Cable
19th 597 Miles 655·22 Cable
18th 468 Miles 513·4 Cable
17th 328 Miles 359·67 Cable
16th 216 Miles 228·87 Cable
15th Feby 1870 96 Miles 96·51 Cable
W. & A. K. Johnston, Edinb

BRITISH INDIAN SUBMARINE TELEGRAPH CABLE CHART

Shewing the Track of
The Steam Ship "Great Eastern" on her Voyage from **BOMBAY** to **ADEN**
and the Steam Ships "Hibernia" "Chiltern" and "W. Cory" between
ADEN and SUEZ
With the Soundings, the Daily Latitude and Longitude,
the Distance Run, and the Number of Miles of Cable payed out.

ming round and round the buoys and the boats, and coming to the surface and close to those at work, again and again. Indeed the sharks have been most assiduous in their attentions to the Great Eastern during her stay off Aden. On the days when some of her men were busy with her screw, and at work on her stern-chains close to the water's edge, monsters fourteen feet long played about them, eyeing the white-fleshed strangers hungrily, and ready to act with sportsmanlike precision in the event of a slip or fall.

Soon after five P.M. a gun from the Chiltern announced the completion of the splice, which being acknowledged by the Great Eastern, the bight was cast into the sea and paying-out recommenced by the latter. Before long the harsh rocks of Aden were softening in the fading light, and men spoke kindly of it as "really not a bad station—*to leave.*" Distance first gave the rugged place that strong resemblance to Gibraltar which all who see it for the first time remark, and then seemed to convert it into a volcanic island rising abruptly out of the sea. We had parted company with the crowd of native boats, and the shouting crews of black traders, their owners, long before this, — a barge-like craft, painted red, which stood out of the water disproportionately at its stern, resembling the ships of war in Holbein's pictures, being the last to leave. The little fleet of telegraph vessels was now in position, the Great Eastern in the middle and slightly leading, as became her superiority — the Hibernia on her port, and the Chiltern on her starboard side. The two last vessels were under sail, and it may be doubted whether, from the days of Marco Polo to our own, there has been a fairer spectacle, or a more important venture, seen in these waters, than that furnished by the three cable-ships, when, as it seemed, stimulated by recent success, they went forth proudly to their mission. The mountains of Asia, lofty and frowning, and with pretty little bays of glittering white sand nestling at their stony feet, were in sight for hours; and a calm, close night, a sky brilliant with constellations, among which the Southern Cross was prominent, and a glassy sea, marked the commencement of the second portion of the great work.

7th March.—It says something for the effect of a wide experience of Oriental countries upon the mind when a pilot in petticoats can be seen on the bridge of the Great Eastern without surprise. The Arab Ali Rischdi, to whom this description applies, is to accompany the Expedition to Suez, and in his appearance and attire strengthens the impression conveyed by Aden that we have left India and its races far behind. A heavy shower of rain, every drop of which seemed boiling as it fell upon face or hands, and a dull and muggy atmosphere, alluded to complimentarily by the experienced as "Red Sea weather," were the early morning's greetings to those who came on deck to see the ships' passage from the Gulf of Aden through the Straits of Babel Mandeb into the Red Sea. The sandy ranges of Abyssinia had closed in upon us on the left, while on the right the rugged Arabian coast stretched out to meet the island of Perim, on which the barracks and other signs of British occupation were plainly visible. After passing the rocky group called The Brothers, the Great Eastern pursued her course through the large Straits followed by her consorts, and shortly after a steamer for India had passed through the small Straits at Perim's opposite end. At noon to-day we were in latitude 12° 44′ 39″, longitude 43° 19′ 0″; had run 122 miles and paid out 124 miles of cable, or only two per cent of slack, owing to the shallowness of the water. At 5 P.M. we were off Mocha, the white stone houses and minarets of which glistened in the sun, and which looked as handsome and cleanly as many an Oriental city would do if viewed through a telescope at a distance of twelve miles. The coffee capital, as seen from the Great Eastern, might easily have been a well-built, well-drained town, with wide streets and squares, a parade, expensive lodging-houses, a corporation, a beadle, and a mayor. At a quarter to six P.M., a steamer, which had been in sight for some hours, came up with the Great Eastern, slackening speed when alongside, dipping her ensign, and cheering us. This was the Krishna, bound for India with passengers; and it was at once signalled that the Great Eastern would report her through the cable to Bombay.

The line being paid out now has been manufactured specially for this, the shallow portion of the Red Sea, and looks less like a cable than so much flexible bar-iron. It is slightly less in diameter than the deep-sea line, but is closed in with galvanised wires, over which is a single covering of jute-yarn, and a coating of Clark's compound. Its weight is 3¾ tons to the mile, while that of the Bombay main cable was but 1¾ tons. The cause for this intermediate cable being thus additionally heavy and strong is the shallowness of the water in which it is laid.

Keeping as direct a course as the position of the seas and the numerous rocky islands she has had to avoid would allow, the Great Eastern has yet been in comparatively shallow water, the soundings having ranged from 30 to 40 fathoms ever since she entered the Red Sea. Apart from any special dangers which may, rightly or wrongly, be supposed to attach to this sea, cables lying in small depths are exposed to many vicissitudes they escape when the water is deep, and the portion of the line being laid now has been made to surmount these. When the Great Eastern finishes her work to-morrow, and Captain Halpin and the electricians and engineers transfer themselves to the Hibernia, the water will have deepened to several hundred fathoms, and the lighter or deep-sea section, weighing 2¾ tons per mile, will be spliced on and laid.

8*th March.*—At a quarter past six this evening we were abreast the volcanic island of Jibbel Teer, and we knew that the time approached for leaving the Great Eastern. The sea had been deepening rapidly for the last three hours, and we had passed from 38-fathom water at eleven A.M. into a depth of 558 and afterwards 768 fathoms. The cable, notwithstanding the brakes on it, went out with unexampled rapidity, going over the stern at the rate of seven, and at one time eight, miles an hour. This, and the weight of the cable being laid, made its buoying an anxious matter; and guns were fired and rockets sent up to the two consort-ships to draw near. It was determined to buoy a bight of the cable a hundred fathoms from its end, and to place this end in a boat, which should lie by the buoy all night. By this means a double hold would be kept on the cable, while the risk which necessarily attaches to delicate operations performed in the darkness would be avoided. Captain Halpin was summoned from the dinner-table by the news that all but four miles of cable were paid out; and for the next two hours the interest centred on the ship's stern. The moon was not yet visible, and the night was dark, but fine—the sea being calm and quiet. Lamps were lowered from the paying-out wheel, and hung close to the water; while one boat was pulled round and remained under the stern, and another boat took charge of the buoy. On this buoy a lamp was fixed, so that its position would be easily seen through the night. On the Great Eastern's deck there were abundant evidences that something unusual and momentous was going on. The starboard side was almost deserted, while the port one was alive with excitement. The long line of lights marking the trough leading from the fore-tank to the stern was frequently obscured by figures passing rapidly with messages or intelligence to and from Captain Halpin and those in the tank. Halpin himself stood close to the opening in the stern, and in such a position that he could mark the precise strain upon the cable and alter the position of the ship by a word to the officer on duty at the pneumatic signals close by. The dynamometer had its own little group of observers, who were carefully recording its narrations in their books. The men at the brakes, and with the hempen stoppers, were all on duty; and one motionless figure, with an axe over his shoulder, like the headsman in Mr Harrison Ainsworth's historical romance, stood ready to strike and to sever the cable the instant the word was given. "Have you got a knife to cut that painter off, if the cable's too much for the boat?" "Have you got spun yarn?" "Tell the other boat to come alongside;" and some other queries and instructions having been answered satisfactorily, the men holding the cable were told to "Veer handsomely"—in other words, to let it pass out very slowly and gently: and then, at the proper time, "Cut!" was shouted; and down came the axe, and the rope which had been attached to the end of the cable before the latter left the tank, passed over the wheel and was safe in the boat below. The buoy, with the lantern gleaming at its top, and the loop of the cable fastened by a rope to its chain, was floating safely some distance off, and the Chiltern was now signalled to stand by it for the night.

It will be seen that this buoying was conducted on a different principle from those described as taking place in water as shallow as 40 fathoms. Here the depth had been proved to be variable, the soundings differing from 50 to 200 fathoms each time they were taken, and the Admiralty chart not giving definite information. There was little doubt, however, that we were from half to three-quarters of a mile from the bottom; and this, with a heavy cable, made it wiser to avoid all chance of having to grapple and pick up. Five minutes after the buoying was over, the exodus from the Great Eastern began. Boats were plying to the Hibernia with men and luggage immediately; and those who preferred to keep their quarters for the night were warned that the last boat would leave at daybreak, and that the work would be resumed from the Hibernia directly it was light. We were now in latitude 15° 41′ N., longitude 41° 50′ E.; and the three ships steamed slowly about the buoy all night. The thermometer at noon was 81°, the barometer at 30. There had been 154 miles of cable paid out since yesterday, and 278 miles since we spliced with the shore end, nine miles from Aden—giving two per cent of slack.

PUBLIC

CHAPTER VII.

ON BOARD S.S. HIBERNIA, IN THE RED SEA.

9th March.—Up, and on the Great Eastern's deck at five A.M., and after hurried farewells and a rapid interchange of good wishes with the great ship's officers, Captain Halpin, Mr Laws, Mr Forde, myself, and a few others who had been permitted to remain till the last moment, descend the familiar companion-ladder for the last time on this Expedition, and are rowed over to the Hibernia. The sea is smooth as glass, and has the peculiar oily sliminess I have seen before in these waters. The sky is dull and leaden, and the atmosphere such as in England would be the sure forerunner of a thunderstorm. The thermometer stood at 84°, but the absence of the faintest breeze made it far hotter than these figures imply, and merely passing from our boat up the steps leading to the Hibernia's deck threw one into a profuse perspiration. The Hibernia was close to the buoy, and to the boat which had been lying by it through the night, the men in which smiled as we drew nearer, as if profoundly glad at the prospect of being relieved of their charge. The rope attached to the end of the cable was passed up from the boat and handed in over the Hibernia's stern, of course bringing the cable after it. It was easy to see where the boat's keel had rubbed the coil, for in places the friction through the night had removed the hempen covering, and the steel protective wires shone white and cold through the frayed edges of the lacerated rope. These wounds were but two or three in number, and only a few inches long, but they recalled an expressive phrase used by Dr Russell, who, in describing an injured electrical cable, alludes to the almost *human* suffering of which it seemed capable. In the case before us, the injury amounted to little more than a torn coat, and the few yards containing it were soon chopped off. The continuation of the line which had kept peacefully out of the boat's way was also on deck, invigorated, the electricians said, by its night's salt-water bath; and with this the cable on board the Hibernia was now to be spliced. The two tanks of the Hibernia are far less in diameter than those of the Great Eastern, holding but 2¼ miles of cable in each layer or flake, against 7¼ in the great tank of the latter. The end of the line in the fore-tank was now brought on deck and spliced in the usual way with the cable brought in from the boat. While this was going on, the ship was kept almost motionless, with her stern to the buoy, to which the loop of the cable was still fastened, and which testified to the great depth of the water by the extent to which it was immersed. A steamer which passed us at this time in the distance, on her way to Suez, would, we calculated, easily make out what we were doing, and would take good news of the Expedition home. We were still off the island of Jibbel Teer, which rises 900 feet from the sea, and from the peaks of which smoke is said to issue at times, though I have heard this doubted by experienced Red Sea voyagers. But whether the volcano be extinct or not, the traces of its existence are very marked. Englishmen call the island by its Indian name Jibbel Teer, or hill of birds—and the quantity of boobies which kept hovering round the ships and their boats seemed to justify the title; but the El Shooree tribe from Muscat have christened it Jibbel Dokhan, or hill of smoke; while to the Arabs and Abyssinians it is known as Jibbel Sebain, or hill without anchorage. Call it by what name we will, it looks as dreary and desolate as Aden itself, and is without a vestige of habitation, the one variation in its mass of brown bare rock being a small sandy patch on which it is said a landing may be effected. The Great Eastern lies between the Hibernia and this island, and the Chiltern remains about half a mile off seawards, until the splicing is finished, and until the boat's crew in waiting have released the cable from the buoy, and the paying-out from the Hibernia has commenced. At half-past eleven A.M., guns are fired, and farewell signals interchanged with the Great Eastern, after which the Hibernia and Chiltern start on their way in company. The Great Eastern turned for Aden at once, and those going on deck after luncheon for a last look at her, found that she was already out of sight.

It seems like one of the revenges against detraction brought about by Time that the great ship has thus, though in a widely different sense from the one contemplated by Brunel, fulfilled the mission for which she was originally designed, —that of bringing England and the East nearer to each other. Built as one of an intended fleet of six monster ships for collecting homeward-bound passengers at Galle, from Bombay, Calcutta, Singapore, and the China ports, what she has done now and what she is destined to do next year, is to annihilate time and space by bringing these very places into electrical communication. She will now coal at Aden, and will start for England *viâ* the Cape as soon as Captain Halpin rejoins her. It is all but impossible at this, the successful conclusion of her portion of the mighty task, to render the great ship and her commander justice without seeming to exaggerate. If it be remembered, however, that she has on this Expedition carried a greater weight, by several thousand tons, than has ever been stowed in her before, and that the kindly amenities of a social gathering, the order of a factory, and the discipline of a barrack, have been preserved throughout her last and easiest triumph, the legitimate pride of every soul connected with her will perhaps be understood and shared.

At noon we were in latitude 15° 41′ 15″, longitude 41° 49′ 30″; had paid out 57 miles of cable since leaving the buoy, or 335 miles in all; and had run 48 miles, giving 4.3 per cent of slack.

10*th March.*—"All right! all right! all right!" is what the screw of the Hibernia kept saying to me with wearisome persistence throughout the wakeful night. There had been a somewhat puzzling message from Bombay, and this was the answer my fancy framed out of the jarring language of the screw. This ship of 3000 tons is a vast change from the Great Eastern, though it is fair to add that we are all pleasantly surprised at the comforts we find on board. Still, my cabin in the great ship was so beautifully quiet, that the monotonous loquacity of this screw, cheering news though it gives, is a nuisance not to be borne. I go up on deck, therefore, to find a pleasant breeze, a bright starlight night, and a cable passing smoothly out. The Hibernia has a hurricane-deck upon which some cots are strung, and throughout the length of which the gentle head-wind plays steadily. "Sleeping on deck" is a recognised institution among the Peninsular and Oriental Company's passengers when in the Red Sea; and I resolve to ask Captain Welch if I may have a cot strung up here for the remainder of my stay on board his ship. The Hibernia is crowded. Every cabin is occupied; her still fine saloon has been curtailed to make way for a cable-tank; her bathroom is filled with ice, a useful commodity for lowering the temperature of cables while joints are made, and a supply of which was manufactured in the Great Eastern, and sent to the Hibernia on the morning we joined her; and at night every available sofa in the saloon is filled with weary electricians and engineers, sleeping soundly during their four hours' turn of rest. But it is only in sleeping accommodation that any deficiency is felt. In every other particular the Hibernia's internal arrangements will bear comparison with those of the Great Eastern herself,—and after nearly a month's experience of the latter's comforts I know no higher praise.

The weather changed agreeably yesterday afternoon, when the sun came out, and the breeze I found so pleasantly fresh during my night's ramble began to spring up. To-day we have a sea and sky of the brightest blue, and a balmy invigorating wind. Under these conditions, travelling on the dreaded Red Sea is as healthy and cheery as yachting in the English Channel.

The thermometer at noon was at 81°; and under the awning at the stern, by the dynamometer and paying-out wheels, it is hot enough. To stroll to the other end of the ship, and to mount the stairs leading to the elevated hurricane-deck, however, insures a deliciously cool air.

The following was posted outside Captain Welch's cabin this morning :—

"Received from Aden, 10th March.

"Following message received this morning from Bombay, 10th March :—

"*5th March*, 12.35 P.M.

"OSBORN, London, to CRUIKSHANK, Bombay.

"Telegram recording completion to Aden received. Congratulations to Halpin and all concerned."

It is satisfactory to learn that the news of our success has reached London, and to infer that our friends know of our present whereabouts. It is curious, too, to think of the countries through which this message has passed, and the round it has made. Here are we in latitude 17° 15′ 20″ N., longitude 40° 11′ 15″ E., in the Red Sea—with Suez, and direct telegraphic communication with England, within a few days' sail—receiving compliments from Old Broad Street, E.C., which have been first flashed under the sea to Paris, from thence through Europe to Turkey, from Turkey to Mesopotamia, from Mesopotamia down the Persian Gulf, then by the wires skirting the Mekran coast to Kurrachie, and from Kurrachie to Bombay. That they should come from Bombay through the cable just laid to Aden, and from Aden through the intervening waters to the floating telegraph-station from which we are paying out, seems a thing of course; but that a ship approaching Egypt should be talked with from London by way of the countries named, is one more of the many marvels of telegraphy. The cable has continued to go out smoothly, and at noon to-day we had come 454 miles from Aden, and laid 481 miles of cable, or 5 per cent of slack.

11*th March.*—"Great Eastern now coming in," was the message received from Aden early this morning; and just after we were in sight of the little island of Mussarmroo, one of a series of treacherous groups of shoals and rocks off the Abyssinian coast. Low coral-reefs, sandy spots of from two hundred yards to half a mile wide, dot the chart hereabouts by the score, Mussarmroo being the most northern of them all. Our course keeps us some ten miles from it, but its stunted shrubs and bushes can be seen through the glass; and the Arab pilot is eloquent upon its being "not good place for sheeps (ships), ver bad!" This pilot treats electric-cable laying as if he had been used to it all his life, seldom asks a question, and hears of the news of the arrival of the Great Eastern at Aden having reached us without manifesting the least surprise. During the buoying the other night he balanced himself on the great ship's gunwale and smoked cigars with true Oriental calm. He confesses to one ambition—to take the Great Eastern up to Suez. "Plenty water there—not inside harbour, outside plenty; ver good make big ship go; I got papers, and am like Englishman now."

There has, so far, been much more variety on the Red Sea than when we were laying the section between Bombay and Aden, when we spent days without seeing anything to break the monotony of water and sky. The islands we have passed since leaving Aden, many of them with little histories or peculiarities,—as the Harnish, upon which the P. and O. steam-ship Alma was wrecked in 1859, with the engineers of the old Red Sea cable on board; the group known as the Twelve Apostles, strange in shape, like fossilised antediluvian animals; Perim, with the odd story of the mode in which it became a British possession; the Zebayer group, and the difficulty of reconciling the names of two of them, Saddle and Table Peak, with their appearance,—have all helped to give diversity to our progress. Again, we have met or been passed by a steamer or steamers nearly every day—a significant contrast to the old times when the P. and O. Company had this sea practically to themselves. The pilot gives the generic description "Canal boat" to every steamer he does not know, and thus testifies unconsciously to the change effected by M. de Lesseps's success.

At one P.M., the 308 miles of cable in the middle tank were all paid out, and the change made to the aft-tank with the usual precautions and the usual success. It is unnecessary to describe the process again. Save that it occurred by daylight, and on the Hibernia instead of the Great Eastern, it was similar in all essentials to what took place on the latter vessel in the Indian Ocean on the night of the 19th February. In the afternoon we hear again of the Great Eastern, a message coming from Mr Anderson, the chief officer, for Captain Halpin: "Arrived here one P.M. Coolies' holiday. Commence coaling on Monday. Commenced taking off paddle-guard."

As the end of the work approaches, men begin to speculate on their several destinations, and those of their ships. Some of us have pressing reasons for hastening home to England; others think that the new telegraphic line to Malta by Gibraltar and Falmouth will necessitate their making for the former place with all speed; and others, again, talk pleasantly of Italy and the Brindisi route. Telegraphic instructions from Captain Sherard Osborn have been received to-day, agreeing to Captain Halpin's suggestion that the Hibernia should go home by the Suez Canal, instead of returning to Bombay for cargo, as was designed originally. The serviceable Chiltern becomes the property of the British-Indian Telegraphic Company, when the line we are laying is completed, and will return to Aden forthwith. She will be stationed there permanently as a repairing vessel, so that when any accident occurs to either section of the British-Indian cable, she may be despatched to pick up and repair the injured part as soon as the electricians have localised and given in its situation to her commander. To this end she will take in from the Great Eastern the 230 miles of spare cable the latter has on board.

We have had another lovely day, but the sea has shown signs of wild disturbance, as if the wind had been in some other and sterner clime blowing hard. The evening sky, too, looked wild and unsettled, large "mare's tails" and thick solid-looking clouds drifting across it, while sheet-lightning shot out fitfully after dark in sullen patches of light, which gleamed out of, but did not illumine, the black horizon.

The Chiltern has been taking soundings frequently during the last few days, with results which seem to justify much that has been said respecting the variable depths of the Red Sea. Apropos of this we hear interesting anecdotes from those engaged upon the old Red Sea cable. The advances made in mechanics since that operation; Mr Clifford's skill in designing and improving machinery for cable-laying; the strain registered by the dynamometer then, and the odd opinions entertained on the subject of "slack," are gossiped over; while the relative disadvantages of desolate island-stations and a mainland peopled by barbarous Bedoueens are compared. At noon to-day we were in latitude 19° 22′, longitude 38° 47′; had run 604 miles, and paid out 636 miles of cable, or 5.2 per cent of slack. Our average depth has been 291 fathoms; but this gives but little information on the fluctuations spoken of, which have in twenty-four hours varied some hundreds of fathoms. The thermometer at noon stood at 82°.

12*th March.*—Some of the sailors were busy at half-past seven this morning trying to catch some of the poor quails which had flown on board, and were fluttering among the rigging and on the deck; and we were congratulating ourselves on the portents of last night having brought no change, and on the commencement of another day of lovely calm, when this message came from the Aden cable-house :—

"Heavy thunderstorm here. Rain coming into every room. Have covered instruments as well as we can with umbrellas."

The bright sky and smooth sea looked brighter and smoother for the announcement. We were full of pity for the friends we had left in the bamboo hut, but it would have been contrary to human nature to think of a storm at Aden, and of its barren peaks and sides being deluged with water, without feeling relief at having escaped it. The shore-end house at Aden is a structure of a very different character to Mr Cruikshank's solid masterpiece at Bombay, being a slight building of cane and matting, which a stiff breeze or injudicious treatment would assuredly level to the ground. When it was known the other day that the Chiltern had pulled the shore end from the testing-table, and through the aperture in this hut's side, our first exclamations were of satisfaction that the wire had not been made fast to the hut, or it would have been certainly brought down. At Aden, too, where the rare showers concentrate into themselves the violence of many storms, and in a fragile hut situated away from other habitations, and on a portion of the sea-shore which is closed in, and is as the bottom of a basin to the hills around it, the present position of our friends the electricians must be extremely uncomfortable. We are full of sympathy, as the terms of the following reply, which is flashed back at once, show:—"Take particular care," not of yourselves and your health, but "to keep end of cable from damp, if possible;" to which is answered tersely;—"We are putting blankets over it;" which gives us a gratifying picture of professional zeal. Had the cable-end been exposed to the wet, which was pouring into every chamber of the hut, the resistance would have decreased in precisely the same way as if it had developed a fault, which imaginary fault the ship would, without this information, have been stopped to remedy. It would at best have made communication between ship and shore, or tests of the line laid, impossible for the time. On learning, therefore, that what were probably the only dry things left in the hut—the blankets—were devoted to the protection of the cable, the electricians here pitied their drenched colleagues once more, and then came down to breakfast with the philosophy we all find for the misfortunes of friends.

During the day we hear from Mr May, the electrician of the Telegraph Construction and Maintenance Company, who was left in charge of the cable-house at Bombay, saying that he leaves for England next Saturday in the P. & O. steamer, the Sumatra. Mr May's business was to conduct and superintend tests during the laying of the Bombay and Aden section, while it remained in the hands of the Company he serves. Mr Forde's certificate, and the transfer of the cable to the British-Indian Telegraph Company, released Mr May, and his message reads, like another pleasant intimation that the end of the work is near. One other message is received having the same significance. The Hibernia will, if all goes well, have paid out the whole of her 600 miles of cable to-morrow, when a splice will be made with the 250 miles on board the Chiltern, and the paying-out will proceed from that vessel as far as the Dædalus lighthouse, the Hibernia accompanying her as consort. At this point our stock of cable will be exhausted, and we shall probably buoy and wait for the William Cory and the Hawk. This is all according to the programme laid down months since, and already quoted in this diary; and if the punctuality with which the other ships of the Expedition have arrived at given ports, and the curiously exact way in which complex arrangements made long ago, and at a distance of many thousands of miles, have dovetailed into each other, may be taken as a criterion, the two ships will be at their appointed place. We had heard nothing more than that the Hawk left England on February 17th; and it was satisfactory, therefore, to receive the following from Aden:—

"Gibbs sends word per mail that Hawk and Cory are to be at Suez last Wednesday. Making of Falmouth cable to be completed end of February. No other news."

The mixture of past and future tenses in this message—the "are to be," and "last Wednesday"—are easily explained. Mr Gibbs, the manager of the Malta and Alexandria Telegraph Company at Alexandria, has sent a letter to Aden with intelligence of the two steamers, and of their probable whereabouts on the Wednesday after he wrote. This letter has come from Egypt to Aden by the mail, which occupied from five to six days in transit, and the Wednesday has passed by the time this letter is read and its contents telegraphed to us. Calculations are made playfully as to the possibility, or the reverse, of the work being over before we reach the meeting-place, and of a mere splice being in that case the only thing required to complete the line. Should this happen, we should arrive at Suez before the mail with the letters for England we sent back by the Great Eastern to be posted at Aden. An afternoon message from the cable-hut tells us that the storm has passed—"for the present," is added rather ruefully—and that all the instruments have been kept dry. A large tarpaulin has, we learn, been spread over its roof, and an approving "Glad to hear it!" is sent back by Mr Laws.

At six this evening the coast of Nubia was in sight, some jagged purple rocks, like monstrous black teeth, standing out from the horizon, as seen from our port bow. There is a brilliant sunset at this time, and the dark patches which rise abruptly out of the distant water have a background of molten gold. These patches are the mountains of Elba, twenty-five miles inland from the cape of the same name; but they seem, as seen from the Hibernia, to spring separately out of the sea, and to be another group of islands or isolated rocks, like the Needles off the Isle of Wight.

We are in deeper water than we have met with since we entered the Red Sea, and the Chiltern has been taking soundings all day. Yesterday, she signalled 949 fathoms and a sandy bottom, when 358 fathoms was the nearest sounding previously given on the chart. At ten minutes past four this afternoon she signalled 898 fathoms, and at eight P.M. 1027 fathoms. Our average depth during the last twenty-four hours has been 900 fathoms. At noon to-day we were in latitude 21° 16′ 54″, longitude 38° 9′; had run 725 miles, and paid out 793 miles of cable, or slack on the total distance, 9.33 per cent. Although the thermometer stood at 87°, the wind still blew from the north, and made it cool and pleasant on the hurricane-deck; while the growing moon, rising clearly over Nubia, made the night watchers talk genially of the fruition which will have been attained before that moon begins to wane.

Ali the pilot deigns to talk quite favourably of the cable now as "a fantasia" or amusing trifle connected for some mysterious purpose with the ship; and, apropos of mysteries, tells a story of his once having met "a man all same as Arab on board P. & O. boat, who salaam and talk like Mussulman, dress like him too," but whom he, Ali, "saw through the windows of saloon at breakfast; so when he come up and talk again, I say, 'What for like Mussulman? you no Mussulman, you eat ham!' but I never knew but for that; he just the same every way—same dress, same speech, and I with him all day good talk, and never find out before. He been to Mecca and done everything like Mussulman." From which we gather that H.M.'s consul at Damascus, Captain Richard Burton, has been once upon a time a fellow-passenger of our pilot's, and we see in this anecdote another testimony to that famous traveller's knowledge of Mohammedan manners and customs. Ali professes to remember the name directly it is mentioned, and is never weary of expressing his wonder at his having been so completely deceived.

Sunday, 13*th March.*—A cable-ship, on active duty, is an infallible, if not a very minute, self-acting register of its own work. It needs, moreover, neither special knowledge, nor care, nor skill to understand its language. Your cabin-window or port-hole, and its height from the sea, tells the whole story. During the early days of the voyage, and while the cable-tanks are full, you look out upon an expanse of water which washes so near you that it seems as if you could touch it goes on and the ship becomes lighter, these waters recede, until they remind you, by the regularity and impassiveness of their retirement, of the mechanical apparatus descending slowly and surely to crush the sleeper in Mr Wilkie Collins's story of the "Terribly Strange Bed," or of the daily-contracting coffin-room told of by Edgar Allan Poe. For there is something weird and mysterious in a plain of water which descends bodily day by day and hour by hour, while the floating house in which you eat, drink, and sleep, remains unaltered in all externals affecting its daily life. The drums and wheels rotate, as they have done ever since the start; the bell marking the revolutions of the drum performs its tinkling work unceasingly; the words "mile mark," or "splice," are called out at intervals by those on watch; the apparently endless iron rope continues to drop into the sea; the dynamometer registers every change in straining power—all without variation. It is only when you look down into the tank and see the cable hands twenty feet off, and at the bottom of a deep dry well, instead of having to stoop to prevent striking their heads against the deck, or on looking from your cabin-window, that the vastness of the alteration in the condition of the ship comes home. The Hibernia has now parted with the last of the 1660 tons of cable which she carried from London round the Cape to Aden, and which she began to pay out last Wednesday. The result is as perceptible as if she had been slowly moved upwards by machinery, and is shown by the merest glance through the portholes as we pack a few necessaries into the smallest possible compass for the two days we are to spend on board the Chiltern. The thermometer stood at 82° at noon, but had been at 87° and 88° not long before.

By a quarter to eleven A.M., Greenwich time (one P.M. ship's time), or just, as we said to each other, as those dear to us at home were starting for church, the last length of cable on board the Hibernia had been cut and buoyed. The strictest Sabbatarian would, one would think, concede that the work proceeded with was one of necessity; and the good old motto *Laborare est orare* rose to the mind as one looked over the ship's side, to see the boats' crews pulling their hardest beneath the terrible sun, and the cable hands busy with the ropes and chains securing the immersed line. We had nothing but sea and sky in sight, and for the first time since we left Aden the heat seemed insupportable. On the day we parted with the Great Eastern it was severe enough, but its severity was of the kind known as "close and muggy." Previous to and during our transfer to the Chiltern to-day, we were shone down upon by rays which were fierce even to scorching. Those lookers-on who had not the excitement of being actually employed on the work in hand, and who went beyond the awning which shades the Hibernia's after-deck, shrank back hastily, and recalled stories of sunstroke. The sea was dead calm, and its brilliantly clear waters, through which you could see the sharks and pilot-fish at play far below the Hibernia's keel, reflected back the burning heat, and seemed to concentrate it as if by a magnifying-glass. The few white clouds to be seen, drifted so slowly across the dazzling sky, and were so thinly vaporous, that they only spoke of heat; while far away beneath us, and beyond the Hibernia's rudder of rusty red, tiny sea-worms, like animated shreds of seaweed, darted to and fro, and huge black eels lay still and torpid like giant leeches overgorged. Strangely-formed and gaily-coloured fish, some of a bright scarlet, others a deep blue, and others with long proboscis as if of horn, could be seen moving with varying speed below us. The sharks swam slowly, now and again coming up to snap with their ugly mouths at the pieces of wood and old canisters heaved overboard by the sailors; while their proportions, as well as the bright hues and tiger-stripes of the numerous body-guard of pilot-fish swimming above, around, and ahead of them, could be traced long before they came to the surface, and as clearly as if they were in an aquarium. The wind had, contrary to all expectation, fallen, and veered round to the south, and its few faint puffs were hot as from a furnace.

It was in this atmosphere, and with these surroundings, that the chief work of the day was performed. No awning and no shade was possible for those engaged on it; and one could not help feeling, as one saw Captain Halpin and the rest giving or executing orders, that if buoying at night, when it is dark but cool, has its risks, it has its compensations too. We are now in 511 fathoms water, and the buoy with the cable attached to it is so heavy, that the men in the boat whose duty it is to pull it clear of the Hibernia's screw, have no easy task. They respond gallantly to the word "Give way!" and pull their hardest, but they make little progress; and if the contest between the dead weight of five hundred odd fathoms of cable and an iron buoy on the one hand, and muscular strength on the other, were to be prolonged, sporting men would bet against the boat. The buoy is prevented drifting, however, which is all that is required, and is kept stationary and clear of the ship until the rope with the end of the cable is safely in another boat. This done, a few turns of the Hibernia's screw put her at a safe distance, and boats and buoy are left to themselves until the working staff are transferred to the Chiltern. The latter has been sounding all the morning, but has now come up to us, and is in a convenient position almost a quarter of a mile from the Hibernia on the starboard side. While the change from ship to ship was going on, the sailors who were not engaged in it improved the occasion by baiting strong iron hooks with fat pork, and then fishing for the monster sharks they could see so plainly from the ship. Several were caught ranging from seven to ten feet long. Directly these sharks were brought on deck, the "Seedeeboys" fell upon them, tore them to pieces with their knives while they were yet quivering, and will cook and eat them to-night.

CHAPTER VIII.

ON BOARD S.S. CHILTERN IN THE RED SEA.

13th March.—The cable on the Chiltern is in two lengths, and in different tanks. These were spliced at the same time as the other end of the line in the main tank was joined on with the cable brought over by the Hibernia's boat. Two sets of "jointers" and splicers were at work on the Chiltern's deck therefore simultaneously, while the buoy with the loop of the cable remained deep in the water but steady, a few hundred yards from her stern. As splicing has been frequently mentioned in the course of this diary, it may be well to remark once for all, that a splice is proverbially the strongest part of a cable, and that the records of submarine telegraphy give no instance of a cable breaking below sea at the point at which it has been joined.*

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* The process of splicing does not vary, and is effected thus :—

At ten minutes to five P.M., ship's time, all is ready, the ends of the lines are joined, and a boat is despatched to "slip the bight" from the buoy. The flag-staff with tricoloured telegraph flag and iron case for lantern, is first pulled out and deposited in the boat; then the chain holding the cable is set free, and as the latter sinks into its appointed place at the bottom of the sea, the buoy jumps up some feet and almost topples over on its side, as if in an ecstasy of boisterous delight at being released. The boat comes back immediately, and the clumsy red monster is left bobbing up and

The coverings of the core, whatever they may be, are first ravelled back for a considerable distance, generally about sixty feet, and the core itself is cut straight through. The operator then warms the gutta-percha of the core over a spirit-lamp, and moulds it back with his fingers as it softens, until the conductor is laid bare for about two inches. The conductor is then washed with naphtha, so as to cleanse it from all grease or extraneous matter, and solder is run among the wires of which it is composed, so as to unite them into a solid rod. The end of this rod is filed obliquely into a smooth scarf, and to this the other end, similarly prepared, is applied. Fine copper wire is then wound firmly round the joint, and the ends of this wire are soldered to the conductor, one on each side of the joint. Solder is also run over the whole, and the gutta-percha replaced by the fingers in the same way that it was moulded back. Alternate layers of gutta-percha and Chatterton's compound are then applied, so that the core over the joint is somewhat thicker than elsewhere, and the coverings of yarn or wire, or both, are replaced in the ordinary manner of nautical splicing. The effect of the whole process is to make the joint the strongest part of the cable. If the ends of the original conductor could be pulled apart, the wire wound round the scarf could be elongated to the extent of ten inches, and would still give passage to the electric current.

down on the water like a tipsy peg-top, for the Hibernia to pick up, while the Chiltern goes on her way paying out. It is scarcely necessary to remark that it is neither size nor beauty which confers priority of rank upon the ships of the telegraph fleet. As the house in which a monarch sleeps is a palace, and the vessel to which the admiral transfers himself is the craft of honour by reason of his flag; so the moment the task of paying out cable begins, the ship performing it becomes first in rank, while its companion becomes its tender. What the Chiltern did for the Great Eastern, and what the Chiltern and the Great Eastern did for the Hibernia, the Hibernia has now to do for the Chiltern, and the picking up the discarded buoy is merely a symbol of the other and more important duties she has to perform. Intelligence of the William Cory and the Hawk is still earnestly wanted; and Captain Halpin's last instructions to Captain Welch, before the former and staff left the Hibernia, were to intercept and speak with all steamers coming from Suez, in the hope of hearing definite news of the approaching ships. The Hibernia is also to take soundings every four hours, and to signal us the result, but is to suspend this work whenever there is an opportunity of speaking with a vessel outward bound. The number of ships we see is still a matter for surprised comment. The steamer bearing down upon us just before dusk, and which the Hibernia goes forth promptly to meet and speak with, is the third we have seen to-day. The first was at two A.M.; and disregarding or not seeing the warning lights carried on the masts of both our ships, and denoting their special duty in accordance with Admiralty regulations, she ran between the Hibernia and the Chiltern, and was inconveniently, not to say dangerously, near the former. It is not only the Arab pilot who says "Canal boat" now when we meet these steamers. Those on board who were engaged on the expedition for laying the old Red Sea cable, constantly draw the contrast between the solitude of these waters then, and their air of business activity now; while some prophets go so far as to assume that what we see is a mere earnest of what is to come, and that the whole of the trade between India and Europe will be carried eventually through the Suez Canal, making this a crowded maritime highway. "When this happens," I have heard added bodingly, "look out for collisions in the Red Sea."

Our position at one P.M. was latitude 23° 23′ 52″ N., longitude 37° 18′ 33″ E.; the total distance run from Aden being 861 miles, and the total cable paid out 943 miles, or slack at the rate of 9.5 per cent.

14*th March*, 3 P.M.—An exciting morning. All well with the cable, which has gone out and is going out steadily. The wind changed during the evening of yesterday, and there was the freshest sea we have met with since leaving Aden. Large blue waves, here and there foaming into a white crest, tossed to and fro with a long far-reaching swell, which made the motion of even distant ships perceptible. There were two more steamers in sight besides the Hibernia at half-past nine A.M.—each of which was spoken with by the latter. "No news of Cory or Hawk" was signalled back on her return into position at the Chiltern's side, and speculation again ran high as to where we should meet or hear of those ships. There is on board the Chiltern as much cable as will reach some 100 miles beyond the Dædalus Lighthouse; and Captain Halpin seems disposed to go on paying out this, to then attach the end to a buoy, leaving the Chiltern to guard it, and to afterwards proceed with the staff to Suez as rapidly as possible in the Hibernia. In this case we shall perhaps reach the William Cory and the Hawk before they leave, and shall return in them, first laying the 60 miles of shore end and intermediate cable in the latter, and then splicing with the length in the William Cory, and so back to the Chiltern.

All such plans, if indeed they had assumed a sufficiently definite shape to be called plans, were altered at lunch, when the officer on duty brought word that the Hibernia had signalled the name "Cory." We had been just congratulating Mr Forde as the representative of the British-Indian Telegraph Company on the intelligence conveyed in a message from Aden half an hour before, which said, "Line opened to-day to the public from Aden to Bombay," when this other news reached us. There had been, we were told previously, a few days' delay in opening the line for business purposes, because the formal sanction of the Indian Government had not been given; and it was in the midst of chat respecting the advantages and disadvantages of the paternal care of which this fact was evidence, that the Hibernia's last signal was announced. The subject changed at once, and all became eagerly expectant as to the rest of the message and the nature of the news. Guesses were hazarded. "Cory has not arrived," was the unsatisfactory thesis of one gentleman, who was, however, promptly crushed.

We had looked too anxiously for the name to believe that it would be used at all unless definite information was to follow; and while "Is at Suez," or "Is laying cable," or "Has been spoken with," were proclaimed as likely and fitting terminations to the sentence by an equal number of supporters, all at table resented as a personal outrage the supposition that the name "Cory" could be a prelude to "No news." We had not long to wait, in reality; but the necessary delay while one set of flags was hauled down from the Hibernia's yard and other sets were run up, were acknowledged by the Chiltern, and looked out in the signal-book, seemed terrible. At last the message came in full: "Cory arrived. Left Suez Friday night." "What about the Hawk?" said every one. "Message is meant to include both," "Hawk is with Cory, of course," and other plausible opinions, were going round, when it was seen that the Hibernia had something else to say. More hoisting of flags, more acknowledgments, more references to the signal-books, and we have "Hawk gone ashore at Ismailia" given out. This is a surprise indeed. It chances that I am the only person in the Expedition who has been through the Suez Canal; and "going ashore at Ismailia," has a far less thrilling sound to me than to those who have not seen ships go aground on the soft sandy banks between Port Said and Suez and be got off again without injury. There is no time to discuss the question now, for the hour approaches for the change from the fore to the aft tank, and Captain Halpin has to leave the bridge to superintend the operations at the former, and to give directions for the stopping of the ship. It is essential, however, to have the fullest information, so—"We are going to stop—come on board," is signalled to the Hibernia; while one of the Chiltern's sailors is sent aloft by Captain Edington with instructions to report "anything in the shape of a ship directly he sees it." The Arab pilot goes up the rigging too, glass in hand, and looks in his crimson vest and fluttering white robes rather like a signal of distress or a huge red-and-white flag hoisted half-mast high. He and the look-out man report the Dædalus Lighthouse as in sight on our port side, and it is easily made out soon afterwards with the naked eye.

The change from tank to tank takes place with all the ease which has marked the other operations of the Expedition; and Captain Welch is rowed over soon afterwards from the Hibernia. The ship from which the news of the William Cory came was an Arab boat, bound for Jiddah with Mecca pilgrims, and which the Hibernia succeeded in speaking with when astern of us in course of sounding this morning. The evidence seemed more conclusive than the language in which it was conveyed. "One big ship, with wheel behind and in front like yours, come Suez, and pass my ship on way here Friday night. A little ship, with wheel too, I hear go aground in Canal by Ismailia and come off again; but only the big ship get to Suez when I leave." The "wheel like you" (for paying out), and the "big ship," marks the William Cory as conclusively as if the Arab had known its name; and assuming the Hawk to have been delayed even temporarily at Ismailia, it is possible that the commander of the William Cory would push on, having heard by telegraph from London of our near approach—so as to meet the Expedition as soon as possible. This seems the feasible explanation of his passing the Arab ship on Friday; the only difficulty is, why he and his vessel have not yet been met. This some of us explain by the assumption, that as the exact quantity of cable on the Chiltern is known to the captain of the William Cory, the latter is waiting for us, not at the Dædalus, but at a position near where we shall have to splice or buoy after having finished the whole of our cable. Concerning the Hawk, we have not the smallest anxiety, believing — even if the news of her having run aground be true—that a brief delay in getting to Suez is the worst which can have happened. Captain Briscoe, her commander, knows the Suez Canal thoroughly. It is not four months since he received a handsome testimonial letter signed by Lord Houghton; the Hon. T. Bruce; Mr John Pender, the Chairman of the British-Indian Telegraph Company; Mr George Elliot, M.P.; Mr W. H. Gregory, M.P.; Mr Hawkshaw and Mr Bateman, the eminent engineers; Mr Edward Dicey; the present writer, and other gentlemen;—in which the skill he had displayed in navigating the Hawk through the Canal during the opening ceremonies, and while those signing it were on board her, was spoken of in the highest terms. That was an experimental voyage, during which it was decided that the Hawk could bring the shore end through the Canal with safety; and to me it seems quite impossible that anything serious can have happened to her now.

Mountains, and indistinct clouds settling on the horizon, are seen far away on the starboard side at six P.M. They gradually assume form and shape, and outline after outline is recognised by aid of the chart, which gives a *facsimile* of them in its margin. They are the Emerald Mountains, on the coast of Egypt, and are some eighty miles off. They form a wild and barren range; but the distance between us and them is too great for us to do more than point out to each other the Jibbel Waddy Schuma, which towers 4500 feet high, and is the loftiest of them all. The Hibernia is instructed to keep from eight to ten miles from us on the port or land side, so as to make sure of intercepting the William Cory. She fires guns and lets off blue-lights at regular intervals to acquaint us with her whereabouts, but meets no ship, and has nothing to communicate during the night. At noon to-day we were in latitude 24° 48′ 2″ N., longitude 36° 15′ 30″ E.; had run a total distance of 963 miles, and paid out 1053 miles of cable, or 9.43 per cent of slack. The depth had been very variable, but averaged 549 fathoms.

15*th March.*—Success gives confidence, and it has become with us so much a matter of course that the cable should give no trouble—in other words, that all should go well with the paying-out—that our one anxiety this morning was to either see or hear of the William Cory. Long before sunrise the men on the look-out were supplemented by all on the Expedition who could leave the points of observation immediately connected with the cable, and telescopes and field-glasses were in constant requisition. The morning was dull. The sky was overcast; the sea had lost the beautiful sparkling brightness which made looking at it a pleasure yesterday, and had resumed the sullen greasiness which is apparently its second stage; and there was little air. It was after the horizon had been scoured again and again fruitlessly that a steamer was seen coming from Suez, but miles away from our course on the starboard bow. The Hibernia, which was at the same time some four miles off on our other side, at once prepared to run across to her; whilst those on board the Chiltern studied the approaching vessel closely, and as hull is added to masts from below the horizon, say decidedly that it is not the vessel we so long to see. Then comes a suggestion which is puzzling but pleasant, that it is the Hawk. This, we say, might easily be. The Arab captain was mistaken as to which of the ships had gone aground in the Suez Canal, and it is the William Cory and not her companion which has been delayed. The one thing necessary to refute or confirm this theory is a good view of the bows and stern of the approaching ship, and eyes are strained, and contradictory opinions expressed as to whether these carry paying-out and picking-up wheels. So a bowsprit is declared to be a bowsprit, or the piece of machinery looked for, as the observer allows the wish to be father to the thought, or is sternly practical. Every minute made doubt on this point more difficult; and before the anxious group of watchers left the bridge for breakfast, it was admitted on all hands that the approaching vessel was endowed with the proportions and belongings of other steamers, and no more, and could not, therefore, be either the William Cory or the Hawk.

The Hibernia proceeded meanwhile with her interceptive duties, signalling the strange ship with, "I'll send a boat to you;" to which the latter (it was the P. and O. mail-steamer Candia, bound for Aden) responded considerately by altering her course, so as to stand towards the Hibernia. The P. and O. flag was, I ought to say, recognised from the Chiltern about the time the vessel carrying it was signalled by our consort, so that the act of kindness, coming as it did from a captain in that courteous service, gave us more gratification than surprise.

We were at this time approaching two islands called The Brothers, which were a striking contrast to the other group of islands bearing the same name which we passed off Perim. Those were irregular, oddly shaped, rugose—mere volcanic mountains, with strange peaks jutting upwards out of the sea; these are two slabs of coral, flat as a billiard-table, and like gigantic stationary rafts. There is a beacon flagstaff on the largest of them, marking the site of a proposed lighthouse, which the increased traffic on the Red Sea makes more than ever necessary, and the chart says their surface is 60 feet above the level of the sea. But they look far nearer the water's edge than this; and in their sterile bareness, and in their utter absence of evidences of life, might be floating logs. Beyond these islands is the Egyptian coast, looking for the most part indistinct; but in the portions upon which the sun falls, showing deep ravines and gully-holes, though it is at least forty miles from where we are.

There is considerable excitement when we see the boat pass from the Hibernia to the P. and O. steamer, and back again. Both vessels are now too distant from us for signalling, so we wait anxiously until our consort picks up her boat and steams down in our direction. We are paying out cable all this time, and cannot alter our course. All eyes are on the Hibernia's rigging, and guesses are made as to the nature of her message, much as we play with the seal and eye the post-mark of a letter we know to be important, but hesitate to read. Spelling out news word by word from flags is a slow process at best, but it seemed interminable now; but we learnt at last that the Hawk and William Cory were at Suez on Monday (yesterday) when the Candia left, and that it was then blowing too hard for them to attempt to land the shore end. Nothing could be better. We are now within twenty or thirty miles of the end of our cable, and shall be able to carry out the scheme shadowed forth by Captain Halpin two days ago—namely, to buoy the cable-end, leaving the Chiltern on guard over it, and push on in the Hibernia so as to meet the other ships before they are out of the shallow water of the Gulf of Suez. A second message from the Hibernia, to the effect that the William Cory had been aground in the Canal, but not the Hawk, only confirmed the opinions we expressed yesterday.

The having been passed by "the big ship, with wheel like yours, last Friday," of the Arab captain, was clearly a blunder too; and the Chiltern, whose speed had been lowered to enable the Hibernia to overtake her, proceeds on her way rejoicingly, and empties her tanks of the cable, the end of which is sealed and buoyed, without impediment or delay, in 400 fathoms water. This was at half-past two P.M., in latitude 26° 26′ 30″ N., longitude 34° 45′ E. The total distance run was 1093 miles, and the total cable paid out 1196 miles, or slack on the whole length, 9.44 per cent. The Chiltern now resumes the position of subordinate vessel in the Expedition—Captain Halpin, the engineers, electricians, and cable hands being transferred with all speed to the Hibernia, which starts at once for the Gulf of Suez, leaving the Chiltern by the buoy.

The striking, almost painful, contrast between the unceasing activity of a ship up to the last moment at which she is paying out cable, and the minutes and hours immediately following upon the time when the cable is buoyed, is more marked on a vessel of 900 tons or so, like the Chiltern, than on ships of larger size. This, and the knowledge that paying out would not be recommenced even when the Hibernia was reached, combined to tinge with melancholy the cessation of work this afternoon. As the cable end was dropped into the sea, and the buoy to which it was fastened first dipped itself clumsily on its side, and then, steadied by the weight, rode clear, a great stillness fell upon the ship. It was like a sudden transition from life to death. The somewhat noisy iron wheels and drums which had moved round and round as regularly as a human pulse; the machinery for unwinding the cable from the tank and passing it over the stern; the clocks and bells, the scales, weights, and measurements, the tell-tale registers, all so pregnant with life and meaning five minutes since, are so much inanimate metal and wood-work now. The cranks which no one would have dared to trifle with then, may be treated as familiarly as you please, and are in fact passed with utter indifference. Communication with the land, messages to or from the little house 1000 miles off, are now a wild impossibility, and it is as if the living soul of the ship had fled. There is small time, however, for these trite reflections; for the packing of electrical instruments, and the fuss and stir inseparable from transferring men from one ship to another in boats, begin again, and we are soon on the hospitable Hibernia once more, and calculating the number of hours in which we shall be at Suez.

CHAPTER IX.

ON BOARD S.S. HIBERNIA IN THE RED SEA.

16*th March.*—To wake at one A.M., to turn drowsily in your swinging cot, and to become aware that romantic mountains, bathed in moonlight, are apparently within a few hundred yards of you, and where there was only sea and sky when you turned in two hours before, is almost as novel an experience as sleeping on deck was to me until a few days since. This was my first view of the island of Shadwan during the small hours this morning. Near yonder revolving light, and on a reef some three miles from the point to the right, the Carnatic was lost. The brown hills of the fairy-like isle stand out grandly against the lustrous sky; the opal-coloured sea has scarcely a ripple on its surface, and reflects back, here the dancing moonbeams, there the solemn shadows from the land; while the latter, in its curious varieties of outline and colour, its gorges, caves, and dells, or what stands for them in the mellow moonlight, provokes many a wayward fancy, and makes one almost look for Prospero and Miranda on its yellow sands. It is an exquisite scene.

At three A.M., and as some of us are still gazing over the ship's side silently, the look-out man gives notice that a vessel is in sight; and the Hibernia, true to what we call jestingly her piratical mission, alters her course so as to stop and speak with it. For it is still of the first importance to hear the latest news from Suez respecting our two ships, and to know definitely whether they have started or not. We are now about four miles from Shadwan, and the steamer comes between us and the land. After sending up rockets, and burning blue-lights, the Hibernia fires her gun, and runs at a safe distance across the stranger's bows. A boat is then lowered and sent over, when the captain (a Prussian) of the stopped vessel is found by the Hibernia's officer to be verbosely indignant. "He, by his soul, knows nothing of the accursed Coree or the thrice accursed Awk! May the devil fly away with both those pestilent ships, if he, by his faith, wishes to know anything of them, or to hear their detested names again!"—and much more to the same effect; after which ebullition of considerate courtesy, this urbane commander mutters ferociously as to his ship having been stopped, and on our presuming to ask so exalted a person as himself for information. There was a pantomimic earnestness about this sailor's rage which makes the remembrance of it very comic. The surroundings, too, were like one of Mr W. Beverley's happiest stage effects; for the steamer was but half the size of the Hibernia, and her black hull and outline, her tiny coloured lamps, her spars and ropes, with the picturesque moonlit island in the background, looked, as she moved slowly off and faded into darkness, like a beautiful panorama got up specially for us.

This is the last time on this Expedition that the Hibernia will have to perform the onerous and unpleasant duty of seeking information from strangers, for the two ships we are in search of came in sight soon after daylight, and were within signalling distance at eight A.M., the William Cory paying out cable, the Hawk acting as pioneer, and steaming about a quarter of a mile in front. There is an end, therefore, to the scheme of reaching Suez before they left. It would be difficult to imagine a greater nautical contrast than that furnished by these two ships. The Hawk is a smart yacht-like craft, built originally as a Confederate blockade-runner, and, as one of the sailors said in my hearing, "a reg'lar pictur in the water." The William Cory is a strong serviceable vessel, built for the Newcastle coal trade, with an excellent reputation for cable-laying; and, like the useful Hibernia, quite entitled to despise the meretricious attractions of external beauty.

Captain Halpin at once signalled the approaching ships to stop; the William Cory to prepare to cut and buoy the cable, and the Hawk to come alongside. The reason for this will be easily understood. We were now in the Gulf of Suez, in 38 fathoms water only, and splicing there would be comparatively without risk. The other cable end being watched by the Chiltern, is in 400 fathoms water, and to pay out to it would involve slipping the bight of the united cable in deep water, and the chance of extra delay in the event of bad weather. In other words, the cables from Suez and from Aden would have to be held up on the ship's deck at the same time—a conjunction which, though possibly safe, prudent men prefer to arrange for in waters such as we were in, where picking up is not difficult. The splice to be made with the cable attached to the Chiltern's buoy will now be with that quietly coiled on board the William Cory, after which the paying-out will be continued from the latter to the end to be buoyed now.

After a little needless delay in responding to and obeying signals, the two ships were stopped, and Captain Halpin and Mr Laws went on board the William Cory, the latter proceeding to the electrical room and testing the cable through to Suez. All was well with it. Then Mr Forde and myself followed in another boat, and messages were sent to friends at home through the line to Suez before it was cut. The three ships kept in position for some hours, while the tests and the sealing and buoying were completed; and here we had another of the striking pictures which have arisen naturally out of the Expedition's progress through the historical Red Sea. We were now 110 miles from Suez, in the narrow gulf bearing that name, with the Sinai region on one side, and the loftiest peak on the African coast, Mount Akrab, towering above us on the other. The latter is, according to the chart, 10,000 feet high; and as the branch of the Red Sea in which we are lying now is but fifteen miles wide, the detailed features of both coasts were clearly discernible. Miss Martineau, in her brilliant record of Eastern travel, remarks, when treating of the district we were in, that "wilderness is the most indescribable of all the attributes of scenery;" and as we gazed upwards from the sea—blue beyond description—to the solemn rocks, upon some of which avalanches of fine white sand are lying, and knew that beyond these, in a direct line from where we lay, were the sacred mounts of Sinai and Horeb, I, for one, experienced the impossibility of putting the feelings of the moment into words. For, to quote Miss Martineau again, "the great interest of the Sinai region lies in its unaltered and unalterable character. There it is, feature by feature, the same as when those events occurred which make it holy ground. In every other kind of scenery there is more or less change from one thousand years to another. The country is differently cleared, or cultivated, or peopled; even the everlasting Nile changes its course. But here, where there is neither clearing, nor cultivation, nor settled people—where it seems as if volcanic action only could make new features in the scene, and where volcanic action does not seem probable—there is no impediment to one's seeing Sinai as it was when Moses there first halted his people.

"I looked abroad that day," continues the same writer, "with the eyes of a disciple of Moses, who had followed his footsteps from Memphis hither; and I saw more than by many years' reading of the Pentateuch at home. How differently the Pentateuch here reads, from the same worn old Bible which one has handled for five-and-twenty years, I could not have imagined. The light from Egypt and Arabia shining into it illuminates unthought-of places, and gives a new and most fresh colouring to the whole. I little thought ever to have seen so much of Moses as I did this day, within sight of Arab tents, like those in which he and Zipporah and their children lived when first here with Jethro's flocks, within sight of the same peaks which were landmarks to the wandering tribes, and of the same wadees where they rested, and surrounded by the very same mountain springs whence they brought water for themselves and their flocks."

It was beneath these peaks, and while floods of sunlight were lighting up their every ravine, that the three cable vessels waited for some hours, parallel with the hidden mountain of Sinai, and one hundred miles below the point assigned by tradition as the one where the Israelites crossed the sea.

The Hawk left for Suez, and the William Cory and the Hibernia turned for the point at which the Chiltern was waiting, soon after three P.M. The sea was then smooth and motionless; but on looking southwards down the Gulf of Suez, about three hours later, some singular phenomena were visible from the Hibernia's deck. The William Cory, which started half an hour before the Hibernia (and, let me add here, beat the latter at the rendezvous next morning by fourteen miles), sent up smoke which went in a long line from east to west, over the Egyptian coast; while the smoke from another steamer coming up the gulf, and within a quarter of a mile of her, went in a long streak over Sinai, or in a diametrically opposite direction. There were curious rugged black clouds, too, flitting athwart the azure sky, and some of us who were below were summoned on deck, that we might not miss the strange sight furnished by the lurid sun, as it disappeared angrily behind the desolate peaks of Africa. The savage grandeur of this spectacle, and its extraordinary combination of purples, browns, fiery yellows, and burning reds, took it out of the region of our familiar earth, and suggested to more than one observer Martin's picture of the Last Day. Still, we thought no harm of it. It was a phenomenon peculiar to the region perhaps, and we had grown so accustomed to waters whose variations were all favourable, that "Red Sea weather" had become proverbial with us for facilitating every operation connected with cable-laying; and we turned in for the night, calmly confident as to what the morrow would bring forth.

17*th March.*—A most unpleasant morning, following on a boisterous and stormy night. The strange sunset we watched yesterday has borne unwelcome fruit. We joined the William Cory and the Chiltern at the rendezvous soon after daybreak, when what is known as "a nasty chopping sea" was running, and when our companion ships were mere misty phantoms in the unwholesome quivering haze. There was no sun, and both wind and waves rose fast. The Hibernia laboured painfully, groaning and roaring meanwhile like some living thing in distress; and even the sailors admitted that we were in heavy weather. It was obvious that no cable-work would be possible for the present. The broken billows raged furiously, and, as it seemed, in opposite directions; now drenching, now hiding the two cable-buoys, close to which the three ships were riding, now licking the Hibernia's sides hungrily, and now leaving her screw and keel high and dry in the air. It moderated before noon, until, when we signalled the distant troop-ship Euphrates and the P. and O. steamer bound for Suez, "Delayed by very bad weather; all well," it seemed possible that we might soon renew our work. By evening, and after the full moon had risen clearly, but with a large dull ring encircling its brightness, it was calm; and orders were given that boats were to be ready at daybreak for carrying the several staffs over to the William Cory for picking up, splicing, and paying out. Continued prosperity has made us captious, and this most unexpected check to the conclusion of the work is regretted almost unreasonably.

One of the compensating advantages arising out of the Expedition's delay is, that certain inaccuracies in the existing charts of the Red Sea having been demonstrated, its waters will be probably resurveyed, and the geographical positions on it correctly laid down by the Admiralty. It will be a somewhat perilous highway for strange vessels until this is done, for with the evidences of its increasing traffic before our eyes, there has been something disagreeably suggestive in the conclusion forced upon us. So long as the observations leading up to this conclusion had been taken by one ship only of the telegraph fleet, we deferred impugning the correctness of the charts, although the opinions of our own navigators were confirmed by the local pilot. But now that the captain of one ship landed a party on some dangerous rocky islands in mid-channel, to ascertain their bearings—when independent observations have been taken several times from two other ships, and the concurrent testimony proves these islands to be from four to five miles out of the position laid down in the chart, it becomes a duty to speak out. Let all ships coming to India *viâ* the Suez Canal take warning, therefore, that the charts of the Red Sea are not to be depended on; and that if the deep-water line, as they give it, be followed, such ships are likely to find themselves wrecked on the Brothers (erroneously given as in lat. 26° 22′), islands which are especially dangerous from their being without appreciable elevation, and from their having deep water right up to them. Ali, the pilot, quietly remarked, "I know that—all P. & O. captains know that—charts no good—Brothers much out. On one big ship one day, going right ahead full steam—and I nearly catch him;" and added that the islands Mussamoroo and Delgabe, and "much more islands in Red Sea," are "quite many miles out—every one knows that."

That the soundings given on the charts should have been found insufficient where definite information was wanted most, is interesting chiefly to the owners of the cable just laid down; but that rocks, reefs, and shoals should be given as deep water, and deep water as rocks and reefs, is a fact so pregnant with disaster, so infallibly certain to lead up to catastrophe and loss of life, that it behoves all interested to urge its remedy being undertaken with the least possible delay.

CHAPTER X.

ON BOARD S.S. WILLIAM CORY IN THE RED SEA.

18*th March.*—Call no man happy till he dies, and never let cable-laying expedition congratulate itself again until its work is over, and messages have passed from end to end of every section of its line. On Wednesday when we parted with the Hawk, it was with the firm intention of joining her at Suez in time for the mail to England; as I write we are in the profoundest uncertainty, not merely as to when we shall finish, but when we shall be able to resume work, to hear from friends, or to pass from one ship to another in our little storm-beaten fleet. Worse than all, the cable is broken. The mingled strength and docility which has been our pride ever since we left Bombay, succumbed this afternoon to the terribly sudden assaults of a Red Sea squall; and it is not too much to say, that as men saw the broken end emerge from the angry waters, and come slowly up the ship's bows, they mourned as though one dear to them had gone. For though the greatest evil is delay—the grappling and picking up being a matter of certainty—the charm of uncheckered success has fled, and the Expedition no longer feels itself invincible. Up to the last few days it has almost seemed as if its chief had but to wish for a particular junction of circumstances—the arrival of consort vessels by a certain day, the wind to blow from a particular quarter, necessary intelligence to come through the cable, or the sea to fall—for these very things to happen. Since Wednesday, circumstances have been against us,—in vulgar parlance, "the luck has turned."

The fitful squall came on again with renewed violence after midnight, and was worse than ever at eight A.M. to-day; those who kept the night watches saying that the changes from calm to tempest were positively startling in their suddenness and caprice. A complete lull came on, however, at noon, when the sea went down as quickly as it had risen; and the buoy was reached by a boat from the William Cory, which ship had been gained without difficulty by

Captain Halpin and staff. From this time to the last crisis all seemed to be going well. The cable was slipped from the buoy, the picking-up went on regularly, some hundreds of fathoms of the stout rope attached to the cable were hauled in, the dynamometer showing a strain of from 23 to 34 cwt.—nothing to a cable proved to bear a 5-ton strain; when in an evil moment the treacherous gale broke forth again, and the broadly-built William Cory began to pitch and duck like a feather-weight. Stopping now would have been certainly fatal, so the hauling-in was continued, but more slowly and with infinite gentleness and care, the anxious faces of those watching the dynamometer testifying to their fears. It was the vicious suddenness of the kicks and jumps made by the ship which caused the danger; and when, after one of the worst of these, all apparent strain ceased, it was known too surely that the cable or the line attached to it had given way. The former was the case. A few fathoms of the cable came up, and then the torn end, with its several strands rudely severed, was passed from hand to hand. Each wire had been torn asunder violently by the great jerking of the ship, and the Red Sea gale had broken the Red Sea cable. There was no mark of abrasion, no cut, no sign of kink. It was a sheer forcible wrench which had done the work. The portion of the line which had rested on the bottom, had soft mud of the colour and consistency of putty sticking in its interstices, proving the ground to be favourable for picking up. But the squall now burst forth again in all its fury, and grappling was impossible. We have had a terrible time of it since, the William Cory shipping one heavy sea which washed her from stem to stern; and there is nothing for it now but waiting for the weather to moderate. The Arab pilot talks of danger, and earnestly counsels our making for a harbourage he knows of 70 miles off; but English sailors have different views, and it is decided that we are to ride out the gale. The people therefore who left the Hibernia "for twenty-four hours," when the entire job would, they said, be finished, are weather-bound on the William Cory, literally without a change of clothes. As if to add to their mortification, while the letters of the crews have reached them, those addressed to Captain Halpin, the present writer, and others, have, through some oversight at the Anglo-Egyptian telegraph office, never come to hand, and we have been thus more than two months without a written line from England. We are in 400 fathoms water, and everything is ready for grappling as soon as the weather alters; but the sea, though quieter, is still running dangerously high. It may do its worst now, however, so far as the cable is concerned, without interfering with the picking-up whenever its fury calms; and the effect of this afternoon's sudden treachery will, we hope and believe, be remedied before the detailed news of it can reach England.

19*th March.*—A blank day, with nothing to the shock of yesterday. The broken end of cable has been subjected to a severe examination, and the opinion expressed yesterday is confirmed. Why it broke in the way and at the time it did is not so easy to explain. None of its wires are bent or twisted, but have been pulled apparently to the extreme limit of their powers, and have then given way. If the cable had been put on two steam drums, and tugged at in opposite directions, and with overwhelming force, until it parted, its torn strands would have presented just such an appearance as they do. The sudden jerking inseparable from the action of a small ship in heavy weather is doubtless at the root of the disaster, for the dynamometer never registered a higher strain than

50 cwt., and at the moment before the fracture was at 34 cwt., when it went down suddenly to zero, and spoke no more.

It has been blowing great guns all night, and up to noon there was no thought of grappling. The weather changed then, and at two P.M. the grapnel was let down from the William Cory one and a half mile N.E. of the mark-buoy put down yesterday immediately after the breaking of the cable. The wind was blowing from the N.W., so that the ship's engines had to be used, and we steamed gently over the cable line. The lowered another grapnel nearly at the same time, and swept the bottom over the cable line in an opposite direction. Hopes rose high at half-past three P.M., for the Chiltern was observed to swing round slowly; and on being asked by signal whether she had caught the cable, hoisted "We think so," in reply. Every telescope and field-glass on the William Cory was brought into requisition now, for the two ships were sufficiently near for the movements of each to be observed by the other; and when the grapnel was seen to come up the Chiltern's bows empty, the disappointment was great. At twenty-five minutes past four P.M. the Chiltern's grapnel was again lowered, and at a quarter to eight P.M. the William Cory's was heaved in for the night, its sharp prongs white with friction against the mud, but with no sign of the cable. There was a magnificent sunset behind the long line of irregular purple hills, marking the African coast, but the wind and sea freshened unpleasantly after dark, and a comfortless night followed a melancholy day.

Sunday, 20th March.—A mighty and pleasant change has come over the spirit of the ship. The cable broken and lying at the bottom of the ocean, and the cable found and being paid out steadily as ever, present two such totally opposite conditions of things, that the most familiar elements of life become transformed under them. The contrast between last evening and this is complete. There are no gradations of thought and feeling between the two; and though the deep and widely-spread depression of yesterday seems to have been a little morbid, now that its cause is removed, there is no sort of doubt that it existed, and was shared in a greater or less degree by every one in the ship. We are accustomed to hear at home that "the problem of cable-laying is solved," and that, "after the Atlantic experience of 1865, there is nothing to be alarmed at, even if a cable does break in its laying." The first thesis is correct, the second illusory. "An uncertain busi ness at best" has been the general sentiment with us since the cable broke; and those with the most experience have looked gravest. The uncertainty was as to how long we should be detained, and was undoubtedly considerable; and a passage in the Psalms of the day, "Look how wide also the east is from the west," had a rather bitter significance to men who had counted on having spanned that width electrically before the hour for morning service this Sunday. Given favourable circumstances, and the work before us was easy; but no ship in the Expedition, certainly not the William Cory, is so docile as the Great Eastern, and with too much or too little wind it was quite possible that days might go by before a fair chance of closing with and hauling in the cable would be secured. For at best the line of cable could only be crossed three times in the twenty-four hours; and the weather was such that in the early morning the William Cory, with her head to the wind, took four hours to go over a space about the buoy which she traversed in thirteen minutes when she was turned round. It is true that the worst feared was delay; but delay is serious and mortifying when those interested in the Expedition are waiting for the news of the final success they regard as certain, and when in their secret hearts the men here thought there was a possibility—not a probability perhaps, but a possibility—of further misadventure detaining us in the Red Sea until days ran into weeks.

Picking up, or rather attempting to pick up, was an impossibility until half an hour before noon, for the sea was still turbulent, boiling up about the ship in great crested waves, which would in themselves have caused a terribly heavy and uncertain strain. At eleven A.M., however, it had moderated sufficiently for the experiment to be tried, and in thirty minutes more the grapnel was dragging along the muddy bottom with 600 fathoms of stout hempen rope attached to it from the ship. The soundings taken frequently by the three ships since the accident had varied from 300 to 500 fathoms, according to their position; but where the cable end lay was known to be about 400 fathoms deep. At three in the afternoon it was said confidently by Captain Halpin and Mr Moody that we were crossing the line of cable, and predictions were actually hazarded that we should either bring it up or find that the grapnel had fouled. So confident were these gentlemen concerning the accuracy of their calculations, that when the line, as they fixed it, was passed, without the dynamometer marking any additional strain, the rope was hauled in, and the grapnel examined. This instrument, which is made of strong iron, and some 4 feet 6 inches long, resembles a bunch of fish-hooks in shape, with each hook in the bunch turned outwards; and it gave one confidence when it came to the surface, in all its useful ugliness, at twenty minutes to four P.M., to see that it had become entangled in its own rope in such a way as to impair its efficiency, and that the scientific forecast was correct. This particular "crossing the line" went for nothing, we said; and the rope was lowered, and the ship handled so as to drag across the cable again. Some idea will be gathered of the tedium of the days spent in grappling, and of the necessary slowness at which the ships engaged in it move, from the fact that it was nine P.M. before the spot aimed at was reached again. The group on duty by the dynamometer, note-book in hand, watched the tell-tale finger anxiously now; and when, instead of registering an average of 17½ cwt. as it did when the fouled grapnel was coming up, it went to an average of 30 cwt., faces brightened, and the good news spread. "I think catch him!" said Ali the pilot (an immense concession) to those who were hurrying towards the dynamometer to verify what they had heard; and "I think so too, Ali!" was echoed back joyously by men only too willing to believe. Ali has been a melancholy study ever since the disaster. "What for stay here? What good? Bad for sheeps (ships); not like him, not good; no pick up cable, don't believe. Why not go to Suez? Stay three four day, come back—better." From which, and sentiments of a kindred character, it is inferred that, pilots being paid by the voyage, our Arab friend has a keen eye to the advantage of getting into port and of starting fresh.

To the appeals to his experience of the Red Sea, made by those deeply anxious that the weather should change, he has replied piously; "God knows—not pilot! Perhaps four day, perhaps six day, perhaps fortnight—God knows!" "Are there currents hereabouts, Ali?" asked one nautical investigator, to whom information was important. "Oh yes, plentee current—plen*tee!*" "Does the current go this way, Ali?" (motioning from left to right.) "Peeraps." "You don't think it runs that way, Ali?" (signing from right to left;) and "Oh, peeraps!" was again the prudent but scarcely definite reply. . . . .

There was every indication of our having hooked the cable; and when the first shackle, marking 200 fathoms of rope, was heaved in, in 23 minutes, and the strain on the dynamometer went up steadily to 36 cwt., our hopes were confirmed. The second shackle, or 400 fathoms of rope in all, came up in 22 minutes more, the strain rising slowly to 40 just before, and to 45, and subsequently to 50 cwt., by the time 500 fathoms were brought in. This occupied exactly an hour, and there were another 100 fathoms of rope to come, before the chain attached to the grapnel and the grapnel itself could appear. It had been known to a nicety by those at watch at the dynamometer when the cable itself was off the ground, and the wheels and cranks were moved more slowly than ever now, until the grapnel was above water and they were stopped. This was at a quarter past ten P.M.; and Captain Halpin—who has scarcely left the bows of the ship since the grappling began yesterday—and the rest of us looking down the ship's side, had the gratification of seeing the loop of cable securely fastened by a single bight to one of the grapnel's prongs. I have seen many beautiful sights in various parts of the globe, but I never remember one which gave such enormous gratification as that bit of rope hanging taut from its iron captor; for it spoke of restored confidence in the Expedition's good fortune, and the speedy termination of our labours.

The moon, now past its maturity, and which we remembered gratefully as having smiled upon our shore-end laying at Aden when it was in its first newness, had risen at a quarter past nine P.M., or just before the first shackle came in over the stern, and it now shone down directly upon the ship's bows, lighting up the cable, white with mud and water, almost as distinctly as if it were day. There was a curious atmospheric effect as the moon rose in its golden splendour out of the sea; for its shape was altered, and it appeared first as a deformed square, and afterwards in the form of a balloon, tapering down to meet the water. It was not until it had been above the horizon several minutes that it looked like itself. The storm had left its traces on, or rather below, the water, for there was considerable under-swell; but there was no wind, and men who had been sighing for a calm, now declared the weather to be "too good;" for the absence of wind made it again necessary to drive the ship by means of her engines. Otherwise the grapnel would have acted as an anchor, and kept her motionless; and the difficulty of keeping her moving with sufficient slowness, and at the same time making her answer her helm, was very great.

When the cable was approaching the bows, we were beset with a new anxiety. Suppose the Chiltern, which, as we could see by her lights, was grappling a mile nearer Aden and over the cable line, caught it too, and that, tugged at by the two ships together, it broke again! The bare thought of such a catastrophe was enough, and blue-lights were burnt and guns fired incessantly from the William Cory; while, to make assurance doubly sure, a boat was despatched with a message that if the Chiltern had found the cable it was to be dropped again into the sea. The precaution, as it turned out, was unnecessary, for our consort had been less fortunate than ourselves. We had grappled the cable at a distance of one mile and a quarter from its end, and it hung down in a double bight on each side its restraining hook. The grapnel was kept a few feet from the surface of the water until the portion of the cable nearest Aden was firmly secured by hempen fastenings to a chain and rope which were already over the hauling-in drum and wheels. This was done from a boat lowered for the purpose; after which, at a word of command from Captain Halpin on the deck, the mile and a quarter was cut away and allowed to lose itself in the sea. The grapnel was then hauled up, and the course was clear. A single line of cable fastened to a stout chain was now in direct communication with the machinery, and was easily brought on deck, and its end carried to the testing-room. It had to be ascertained now that none of the remaining line had been injured by the strain. At five minutes to eleven P.M. the tests were over, and we were gladdened by the report from the electricians—"O.K. (all right) to Aden." The act of untwisting the outer coil, and exposing the central copper wire preparatory to jointing and splicing, was begun at once by willing nimble fingers, and with merrier faces than have been seen among us these many days.

21*st March.*—The splice between the picked-up cable and the length on board this ship was completed at twenty-five minutes past one this morning, ship's time, and the paying-out begun. There has been no hitch since, and we hope to arrive at the buoys we put down on the 16th early to-morrow. The Hibernia and the Chiltern were both in position at daylight this morning, the one on the port, the other on the starboard bow. The sea had subsided, and the eternal hills of the African coast, which we have had so many opportunities of studying, were shrouded in a soft quivering mist, which the experienced said would turn into intense heat later in the day. At breakfast-time we met two P. and O. mail-steamers from Suez. They were within a mile of each other, and passed us at about two miles' distance on the port side, looking exceedingly smart and rakish, as seen beyond the rusty-toil-stained Hibernia. They were the boats for Bombay and Calcutta respectively, and the passengers, crowding on their quarter-decks, examining our little squadron and pointing out the cable-machinery, could be seen plainly. The Calcutta steamer was said to be the Mooltan, whose commander, Captain Beazeley, visited us on board the Great Eastern when we were lying at Aden, and when he was on his way to Suez. To the signal, "Is telegraph completed?" put up from the Mooltan, we had the satisfaction of replying, "Nearly;" and congratulations were exchanged between the watchers on the William Cory's bridge, as to the different character of the message we were able to give now, and that which we should have perforce had to look out from the signal-book had the Mooltan questioned us twenty-four hours before.

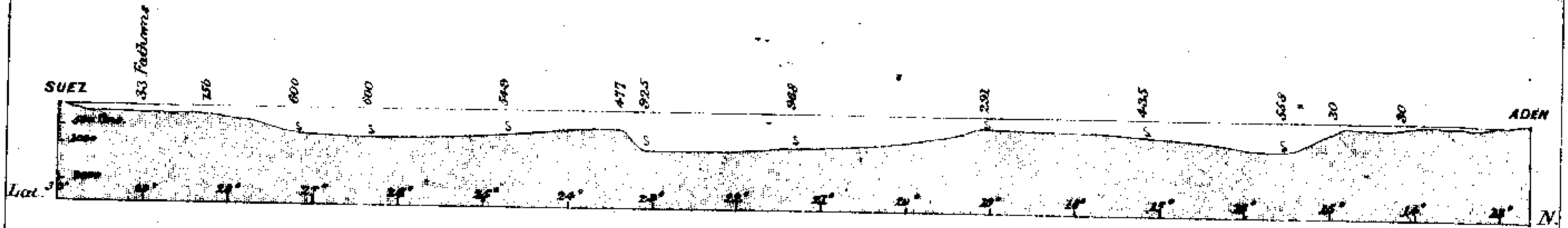
At noon the Hibernia was signalled, "Go ahead, and remain as close as possible to No. 2 buoy, and place a light on it." Three hours later we were abreast Shadwan again, which looked strangely different in the searching light of day to the semi-magical isle fancy painted when it was seen in the soft moonlight from the Hibernia's deck. It is the old trite story of fancied charms departing on close acquaintanceship; and a stage-flat at noonday, tawdry, coarse, dingy, and faded, is not farther removed from the enchanted castle or the fairy grove it represents after the lamps of the theatre are lit, than the Shadwan of imagination was from the Shadwan of sober fact. The latter is a barren precipitous rock, several miles in extent, and in places 700 feet above the level of the sea. It has deeply-graven lines and chasms down its rugged brown sides, as if of dried-up watercourses, and there is not so much as a green leaf to vary its bare monotony. It might be a lump of Aden which had been torn off ages ago, and hurled to the surface here.

The wind began to freshen about noon and was shifty and capricious, veering right round the compass from south to north, and staying at no point long. The island of Jubal, barren and low-lying, is passed as we go through the straits of the same name, and is pointed out as one of the landing-places and stations of the old Red Sea cable. The wind becomes higher now, rushing through the rigging searchingly and with fitful moans, and making it so cold that we put on extra wraps. Both sea and sky, too, tell of "a dirty night;" and it is decided that the picking up from the buoy and splicing must not be attempted till to-morrow. Had the moon shone out and the atmosphere been as bright and clear as it was in our last experience of these waters, it might have been done with safety to-night; but, with a sea which was becoming more turbulent every hour, and a thick fog enveloping both coasts, the only prudent course is delay.

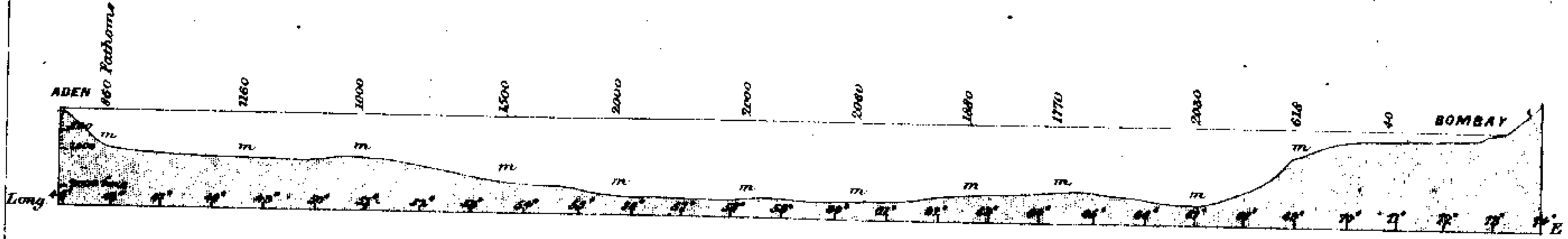
22*d March.*—The final stroke to the work was given at twenty minutes past four this afternoon, when the bight of the united cables was thrown over the William Cory's side; and the captains, the cable-hands, the engineers, the electricians, and the whole ships' companies, including the Maltese mariners of the ship from which the line was finished, gave forth loud and prolonged cheers. Things went awkwardly with us to the very last. The currents, the winds, the atmosphere, and other conditions were all against completion; and the hour preceding the successful termination of the work was one of great mental tension and anxiety. The morning was so foggy that we could scarcely see the Chiltern close to us, while the Hibernia, which we hoped would be lying by the buoy, and near our position at daybreak, was invisible. Large banks of heavy white mist and dense sand clouds enclosed us all round, hiding the mountains on each side as effectually as if a curtain had been drawn over them, and recalling to some of us bygone cable-laying experiences off the banks of Newfoundland. It was while we were meditating ruefully on this new phase of Red Sea weather, and avowing quite unnecessarily, that it would occasion delay, that a sullen boom was heard. There was considerable doubt as to whether this was from a gun; and, during the minutes which elapsed before the sound was repeated, many ineffectual efforts were made to pierce through the dense mist, or to evolve out of it the hull and masts of the Hibernia. We had been paying cable out as slowly as possible during the night, the ship's speed being reduced to between two and three miles an hour, to secure our not arriving at our rendezvous before daylight, and so making it necessary to buoy. When the fog rose, however, about eleven A.M., and the Hibernia became dimly visible, it was seen that we had overrun our mark, and that if a line were drawn from our present course towards Suez there would be a considerable distance between it and the other line we had come to meet. This was of no consequence in itself. A little more slack would have to be paid out than if the weather had been clear and observations possible; but that was all. For the sake of hydrographical symmetry, however, and to avoid any very decided bend in the line of cable, it was determined to pick up a portion of that just laid. This was done by hand, the engineers and the electricians standing shoulder to shoulder, and every soul on the ship joining in a line and pulling the cable in slowly, a ruck of Maltese sailors "heave ahoying" nobly, and adjuring all passers-by to "give a hand" with an energy which was contagious. This was at eleven A.M., and by twenty minutes to twelve A.M. as much cable was brought in as was thought necessary, and the order for "all hands out" was virtually rescinded. The buoy was reached soon afterwards, and at and the end of the cable brought on board. The air all this time was laden with sand brought by the storm from the desert, and bloodshot eyes and tingling pores were the penalties of keeping on deck. The wind began to rise, too, viciously, and blew so directly abeam of the William Cory that it was impossible to keep her stern to the cable. If the reader pictures to himself a heavy ship in a violent current, high waves, and a contrary wind, tugging with all its might at a rope seven-eighths of an inch in diameter, and remembers that such rope, though composed of metal as well as hemp, is only intended to bear a clearly defined strain, he will understand the relative positions of the William Cory and of the British-Indian cable this afternoon. Between the wind on the one hand and the currents on the other, the ship refused obstinately to maintain her position, but "canted round" in such a way as to carry out the 150 fathoms of extra cable which had been coiled on deck to prevent the possibility of strain during the splice. The line from the sea was pulled in consequence to an acute angle from the starboard side, while the William Cory as she rose and fell and laboured in the tempestuous sea, acted precisely as if she were resolute on trying to the utmost the resistance of the slender line in her charge. The other end of the cable had been brought from the stern round the outside of the ship and up over the bows for splicing, and was comparatively free from strain. But it was a mere question of strength as to whether the section brought in over the stern to be joined with it, would part again or not; and as we watched it drawn taut out of the water, observed the cruel jumps and heaves of the ship, and knew the perverse winds were freshening, it was impossible to avoid wishing that the operation which made it necessary to keep the ship stationary could be quickened. This was impossible. A hurried or careless splice, a joint imperfectly made, and the electrical perfection of the cable would be destroyed and the whole process of returning to the spot, of searching for, picking up, and partial relaying would have to be recommenced as soon as we reached Suez. So with Captain Halpin endeavouring to humour the vessel in such a way as to relieve the threatened cable, and with groups of silent anxious men watching the line, which was stretched by great tension for an enormous distance from the deck before it reached the water, the splice was made and finished off with as much coolness and with as complete an absence of fuss or flurry, as if those engaged on it were at the Works at home. To attempt to describe the feelings of such of the officers, electricians, and engineers as were compelled to stand idle, while this mechanical operation went on, and whose eyes were riveted on the part of the cable where the strain fell heaviest, would be simply to multiply synonyms expressive of anxiety. When all was over—when the ropes by which the two cables had been kept on deck were cut, and the bight uniting them cast into the sea—a mighty shout was set up, and the cheers for the captain, the telegraph, and the companies, were long and loud.

The cable had happily proved stronger than the forces opposed to it; but had it been cast in a lighter mould, or had the splicing occupied another hour, by which time the angry elements had increased their fury, it is all but certain that we should have had a second accident, and another bout of grappling and picking up.

We are so accustomed at home to treat submarine telegraphy as a solved problem, that it needs actual experience by eye and ear to comprehend the innumerable delicate conditions requisite for its solution. For the last seven days could well be possible, for though the roughest weather in the Red Sea is nothing to an Atlantic storm, the extreme suddenness of its changes, the impossibility of reckoning for half an hour (for the time, that is, between commencing to lower a grapnel and its reaching the bottom, or for the reverse process of hauling it up) on its mood, and the active contests between winds and currents prevailing on it, have made its difficulties far greater than was expected. To the stout ship William Cory belongs the honour of having had the work completed from her deck, and no social gathering could be cheerier than that held the same evening in her commander's, Captain Donaldson's, cosy, hospitable saloon, which our party overcrowded, and were too comfortable to leave. The squadron was now under way for Suez, its labours over, and a friendly competition as to speed the only task in hand. The storm continued through the night, and at daybreak the deck, and masts, and rigging were coated with the fine gritty powder of the desert. The Chiltern and the Hibernia followed the William Cory into the Suez waters, and all three anchored near the Hawk. The weather we have been suffering from has evidently extended here, for communication between the latter vessel and the shore has been suspended for two days and a half by reason of the roughness of the sea; and the railway is blocked by the tons of desert sand blown over it. We found the Suez hotel full of unwilling guests, most of whom had started for Alexandria or Cairo by rail, and been stopped and turned back by reason of the line being blocked up by sand.



Section of the Bed of the **RED SEA**
From data obtained by the Expedition.



Section of the Bed of the **ARABIAN SEA**

BRITISH INDIAN SUBMARINE TELEGRAPH CABLE.

1870.

CHAPTER XI.

AT SUEZ.

24th March.—The British-Indian line will be worked in conjunction with the Malta and Alexandria one, and the new telegraph office at Suez combines many advantages within itself, and is an improvement in every way upon the one from which I sent messages to England when last here. Indian passengers will readily recall the little telegraphic establishment now given up. The British post-office, with its list of the names of all for whom it has letters hung up in its passages, to prevent anxious travellers playing at useless games of question and answer with the clerks; the Peninsular and Oriental offices, spacious and double-barrelled—divided, that is, into two parts by a central archway—ornamented with what looks so like a reduced copy of an undertaker's hatchment, that you, as a well-wisher to the company, look for the inscription, "Resurgam," when you find it to be a picture of the royal arms, marking the position of the agent as English consul; the fancy shops, where Anglo-Indians coming home, and Europeans going out, are tempted with articles in which the maximum of uselessness and fragility seems to have been sought after and attained; the Café Chantant, where singing and dancing, a small stage, and private boxes, and astounding pictorial decorations, composed chiefly of classical goddesses, nude, corpulent, and deformed, and with pink and blue flesh, may be seen nightly; the other café, where the clickings of the billiard balls never cease from troubling, and where to show yourself on one of its outside seats, is to become as corn in Egypt to the pestering donkey-boys, who shriek at you as "Messter Captain, Sar!" until beaten back by the stout French proprietor in shirt sleeves, who wields a billiard-cue in battle-axe fashion over and upon cotton-clad shoulders and bare or turbaned heads; the sordid ground-floor room, where a public roulette-table is kept, having on it twice the regular number of zeros, and in the purlieus of which, or there is no truth in physiognomy, unite the pleasing functions of the bully, the "bonnet," and the Suez man about town;—all these places surrounded and overshadowed the office in which the telegraphic business between Suez and Europe has been hitherto performed. Its only view a blank wall surmounted by an iron palisading, through which a cheerful prospect of the tops of empty railway carriages and trucks could be obtained; its boundary on the one side the wing of the hotel appropriated to the private residences of the Peninsular and Oriental officials, and on the other the turnings to the station and to the unsavoury thoroughfares of Franco-Egyptian Suez—the telegraphic quarters, replacing this old office, are a change for the better in all respects. The addition of business caused by the opening of the line to India will be very great; and the staff of clerks having been doubled, and additional space being absolutely necessary, a substantial mansion has been taken, and is being fitted up on the other side of the town, and facing the high promontory of Ataka and the other brown precipitous mountains of Egypt. Between these and the new office runs an arm of the Red Sea and a large expanse of marshy sand. The railway runs by its door, and dwellings, houses of business forts, and stores are on each side. Beyond these, to the right, lies the desert, with the first travellers' station of the old overland route just visible; to the left are the new docks, the road to which is unsafe at night, for it is no uncommon thing for the wayfarer to be murdered on it out of hand, and beyond the docks is a fleet of steamers at anchor, which includes within itself the Egyptian, British, French, and Italian flags. H.M.'s troop-ship Euphrates is the largest ship there now; and the tiny tug-boat, bearing a string of barges laden with white stone from the opposite shore to the docks in progress, and a few native dhows, with long masts and enormous white sails, are the only things moving on the waters.

The link now uniting India to Egypt reminds one a little of other and more domestic unions when we visit the mansion in which its belongings are seen. The rite known as "furnishing" is in full progress; and the newest and shiniest of mahogany chairs, tables, and escritoires, tasteful draperies, luxurious lounges, sofas, and divans, together with the general air of agreeable confusion which pervades the house of a newly-married couple before they have "settled down," are to be observed. Jars serves and potted meat, but are really electrical; bright brass handles, wheels, and pegs; letter-boxes and stationery; lamps, thermometers, unattached cells, galvanometers, and retorts; library tables, official forms, bookcases, and bedding, all new, all in confusion, and all speaking of a house freshly occupied, and of the transition state which precedes its becoming a Home, are here. The new curtains, the carpetless apartments, the open doors, and the bed-chambers and dining-room combining unfurnished bareness with indications of future comfort, tell the same story; and while Captain Halpin, Mr Laws, and Mr Forde are busy in the testing-room, I mount to the new mansion's flat roof with vague recollections of the commencement of housekeeping in my mind, and a conviction that I have seen something not unlike all this before.

When on this roof it is as impossible to avoid thinking of the Israelites and their leader Moses as it was when we were anchored off Mount Sinai. Over the bright blue sea, and between yon narrow brown strip of land and the lofty mountains beyond it, lies the Valley of the Wandering; before me are the natural features Moses gazed upon, peopled by races which have not altered since his day. I had, when last in Egypt, visited the island of Roda, where tradition says his cradle was discovered by the Egyptian princess, and had found that bulrushes no longer grew on its banks. I had also made a pilgrimage to Memphis, where he dwelt, and found it levelled to the earth—a few miserable mud huts scattered among a wilderness of palms in place of its temples and palaces, a half-buried statue of Rameses the sole representative of its refining arts. I had, too, spent a morning at Heliopolis, where the Mohammedan tradition says he was a priest, and which, it is conceded generally, was the place of his education, and had found nothing but the grand old obelisk, with many of its hieroglyphics filled up by wild bees, and a circuit of earth mounds in place of the brilliant and learned city—and had read in each the melancholy lessons of time and change. I was now, while mastering the course taken by the cable after it was transferred from the Hawk to the barge, landed, and brought to the building I was on, actually gazing upon the very scene which met the great leader's eyes when he, learned as he was in all the "wisdom of the Egyptians," betook himself with the Israelites to the austere silence of the desert, there to make of them a united nation, fearing, worshipping and obeying the one God. The step from the Book of Genesis to the triumphs of a generation which, according to Mr Disraeli, "deals in shares and calls it Progress," was a long one, but had to be taken, for messages were passing to and from London and India as I slowly but indelibly fixed the view on my memory; and I was soon afterwards informed that Mr Forde was so well satisfied with the tests he had taken, that his final certificate would be given to the representatives of the Telegraph Construction and Maintenance Company forthwith. In the evening this gentleman, acting on behalf of the British-Indian Telegraph Company, entertained Captain Halpin, the captains of the Hibernia, the Chiltern, the William Cory, and the Hawk, and the several staffs, at dinner at the Suez Hotel, to celebrate the expedition's success, when prosperity to the new line was heartily drunk.

. . . .

I may add that the cable was opened to the public at six A.M., on the morning of the 26th of March, or four days after the final splice in the Gulf of Suez, and that many messages had passed through "from each end"—namely, from London and from Bombay, when I called at the Alexandria Telegraph Office at ten A.M. the same day.

NOTES FROM THE HAWK—THE LAND LINES TO INDIA—THE FALMOUTH, GIBRALTAR AND MALTA, AND OTHER SUBMARINE LINES.

NOTES FROM S.S. HAWK.

I WAS indebted to Mr Saunders, a name well known in connection with Atlantic telegraphy, and who is now the chief electrician to the British-Indian and the Malta and Alexandrian Telegraph lines, for the following extracts from his private diary, showing how the Hawk and the William Cory were engaged and delayed while the other work of the expedition was in progress, and when the Hibernia was scouring the seas for news of them. It should be added that his Highness the Viceroy of Egypt gave direct instructions to the local authorities of Suez to render every assistance in their power, and that he caused it to be asked personally and in writing whether it were possible to facilitate in any other way the operations of landing and

"*On board the Hawk, 7th March.*—At half-past six P.M. the Hawk arrived off Port Said Harbour and anchored, it being too dark to enter.

"8*th March*, 6 A.M.—The Hawk under way, William Cory coming up; 7 A.M., Hawk anchored in Port Said; 8 A.M., William Cory, ditto, ditto; 1 P.M., Cory entered Canal; 1.35 P.M., Hawk followed; 3.30 P.M, William Cory grounded, but came off shortly; 4.3 P.M., William Cory ashore, came off again directly; 4.20 P.M., William Cory grounded again, and stuck, notwithstanding all efforts to get her off.

"9*th March.*—At daylight trying again to get the William Cory off the sand-bank, but without effect. At nine A.M. official arrived, and informed us that the Hawk must proceed on her voyage, and leave the officers of the Canal company to get the William Cory off. At ten A.M. the Hawk started ahead, and at half-past six P.M. anchored in Lake Timsah, off Ismailia.

"10*th March.*—The Hawk arrived at Suez, at twenty minutes to two P.M.

"11*th March.*—Suez course of shore end buoyed out, and commenced to dig trench from landing-place up to office, a distance of about one mile.

"12*th March.*—Arabs digging trench. It has been blowing hard all day from the south.

"13*th March.*—Going on with trench, and Captain Briscoe sent part of Hawk's crew on shore to assist. William Cory arrived at Suez at two P.M., coiled land-line and one mile of shore-end cable, on to lighter ready for landing in the morning.

"14*th March.*—Hawk under way at daylight, with lighter in tow, steamed into fourteen fathoms and anchored, when first the tug, and then the ship's boats towed the lighter in until she grounded. All hands went on shore to haul up cable. After great difficulty (owing to the weight of the cable and the length of the trench), and with the combined force of 150 men, Englishmen, Maltese, Arabs, and four mules, we succeeded in getting the end into the office at eleven o'clock at night, having had to pass under two lines of railway.

"15*th March.*—The Hawk and William Cory under way at daylight, the Hawk paying out shore-cable, and the William Cory following, and picking up the buoys. At nine A.M. finished paying out, and passed the end on board the William Cory. At twenty minutes past twelve the splice between the shore end and main cable finished and let go. We then commenced to pay out, and continued to do so during the rest of the day. Tests perfect. All going well.

"16*th March.*—Still paying out. At half-past eight we sighted a large ship ahead, which turned out to be the Hibernia. At half-past nine Captain Halpin and Mr Laws came on board. At half-past two, we cut and buoyed the end of the cable, having payed out 100 miles of main, and 10 miles of shore end."

THE LAND LINES TO INDIA.

Readers of the foregoing Diary may have remarked that it contains no entry under the date 9th February. The matter pertaining properly to that day was too copious and technical to interpolate between the ordinary records, and I prefer giving it here with a few words of personal explanation. Let me confess that, when I started for India, I knew very little of the working of the existing telegraphic lines. I had neither telegraphed to India myself, nor experienced any burning anxiety to hear from India by telegraph, and beyond a general knowledge that the existing system was faulty, my position was rather that of a man seeking information than one holding any strong opinions on the matter. But the conversation of my fellow passengers on board the good ship Sumatra on the voyage between Suez and Bombay, and the remarkable paragraphs in the Indian journals concerning the land lines, inspired me with a strong feeling of curiosity. I wanted to know whether the Anglo-Indian public felt the inconvenience of delay and irregularity as much as those members of it with whom I conversed; and I lost no opportunity, during my stay in India, of obtaining information on this head. What follows is an epitome of the opinions of the commercial and other authorities with whom I was in communication, and among whom were undoubtedly many of the chief users of the telegraph between India and England. It is possible that their views were one-sided, and that much might have been said even then in favour of the land lines which my informants overlooked. I, however, can only tell the tale as 'twas told to me. "Concerning snakes in Iceland—there are no snakes," said the historian; and concerning favourable opinions respecting the then existing telegraphic arrangements, I heard no favourable opinions. I employed myself on the 9th February in receiving and classifying information respecting the land lines, and the result is given in the following pages, in the very words in which it reached me. It is possible that the recent good and prompt working of the Indo-

European lines may seem to weaken the significance of some of the statements, but I think it right to give them as they stand, pledging myself to the high character, as well as to the opportunities of knowledge, of those from whom they were derived.

The term "Indo-European telegraph," said my authorities, "is not strictly speaking correct, since the Indo-European department (the portion which is alone under the immediate control of Government) extends only from Kurrachee to the Persian Gulf. It is thence that the lines branch off in two directions, known as the Turkish and Russian routes respectively. The Turkish line passes to the head of the Persian Gulf, thence to Bagdad, Diarbekir, and Constantinople; whilst the Russian leaves the Gulf at Bushire on the north-east side, and is carried thence to Ispahan, Teheran, Tiflis, and over the land lines of the Russian Government. Although both the Russian and Turkish routes have now been open for some years, Anglo-Indians and every one connected with the East have, except at short intervals, employed the Turkish line only, the other being used by the authorities merely as an alternative line, and in such a manner as to make it often regretted that it exists. First, then, as to the 'Turkish route.' Apart from the possibility of political complications, the greatest objection to this route lies in the fact that it is fed by so many lines in Europe, which, instead of being an additional guarantee of speed and regularity, has proved a hindrance. Instead of there being set apart one or two trunk-lines along which no other than Anglo-Indian messages could pass, the Continental Governments appear to have given precedence to European messages. The 'blocks' on the lines have been continual, and it has been no uncommon occurrence to have the English telegrams dropping in one by one, and ten to twelve days old, whilst, according to the published report, the lines were 'right' to Constantinople. In proof of this, it may be mentioned that, in October 1866, the director of the line at Kurrachee was able to speak direct with Constantinople, while the delays in Europe were constant. These continual 'blocks' were not only the cause of the delay, but are, as those best qualified to judge insist, at the root of the irregularity also, and irregularity is even more serious than delay. What is meant by irregularity is, that the order of despatch from the terminal stations is no criterion of the order of arrival at the stations to which the messages may be addressed. Thus, whenever a delay has taken place from an interruption on the line, the messages which were despatched to India first have almost invariably been anticipated by one or perhaps two telegrams of a week or fortnight later, rendering those of older dates nearly worthless to the recipients. This is generally accounted for by the supposition, which there is every reason to believe well grounded, that when, after several days, the Continental administrations become aware of a break on the lines to, or on the frontier of, Turkey (where most of the delays occur), the forwarding stations, regardless of the hundreds of messages awaiting the repair of the lines, have sent the later messages by one of the alternative routes, and pushed them forward because they were of late date, a course which was pursued until they reached Kurrachee, where the authorities carefully notified the fact that 'messages had been received in twelve or twenty-four hours,' as the case might be, of course ignoring the hundreds of delayed messages.

"The chief administration to blame in regard to inaccuracies and delays has been undoubtedly that of European Turkey; but scarcely less so the various Danubian principalities over whose lines the Indian-European messages pass. There has evidently been a total want of system for the through transmission of messages, and it is marvellous that so little has been done by the different telegraphic congresses which have assembled for insuring uniformity of management. It ought not to have been a difficult matter to arrange for timely warning being given to the original transmitting stations, so that in the event of interruptions, messages *en route* to India might be diverted and forwarded by the lines in working order. Had this been done, however great the difficulties of keeping land-lines in repair, the Anglo-Indian lines would not have become, as has been the case, a byword for mismanagement and irregularity, and the Government of India would not have expended such large sums of money in vain.

"But however superior the management of the lines on the east, as compared with the west side of Constantinople has been, the character of the countries through which the land-lines pass has to a great extent nullified that superiority. During the winters they have been constantly interrupted by storms and frosts. The delays have never, until recently, exceeded from ten to twenty days (although they have often occurred several times each winter), but for the last five months rience. This is attributed mainly to disturbances among the Arab tribes—a significant circumstance when the merits of land-lines in barbarous countries are under consideration. Again, when the lines are broken, the time occupied in sending out parties for repair is necessarily very great, especially when, as was lately the case, the unruly tribes refuse to permit the repairing parties to go out. However well, therefore, the lines of the Indian Government may have been worked—and it is an instructive contrast that while messages from London take often ten to twenty days to reach Fao, they pass on to Kurrachee in about one hour ten minutes—the total want of system in Europe, and the physical difficulties encountered in Asia, completely nullify the efforts of the Indian authorities, upon whom public censure has fallen most unjustly. But even though the Indian Government has done all in its power to insure promptitude and regularity, the state of their own small section of 800 miles between Kurrachee and Bombay, proves beyond a doubt the advantage of submarine over land communication: for it has been no uncommon thing for messages to occupy two to three days in transmission. It will be often found when the British-Indian and Indo-European lines are both open, that messages from Kurrachee to Bombay will take as long *en route* as a message by direct submarine cable from London to the same destination, and this opinion is confirmed by the fact that in the month of January, the fairest season of the year, the delay has this year (1870) exceeded twenty-four hours, although the Government authorities boast, with justice, that they have four lines in working order, over the worst part of the country.

"The result of these manifold defects and difficulties will best be seen by comparing the times occupied in transmission from London to Bombay, but before we do this, the Russian line claims a word.

"Until the prolonged break on the lines between Fao and Diarbekir, the Russian route had been rarely used by the public, but it has often been employed by the various administrations during the last four years. Not only were the signallers employed on the Russian lines apparently unacquainted with English, but the physical difficulties of keeping the lines in repair greatly exceeded those encountered by the Turks. But the worst portion of all, as we are informed on indisputable authority, is that between Teheran and Bushire, which, whether from bad management or bad construction, has been in a state of chronic interruption. Although, therefore, the land lines just opened for traffic may work admirably between Teheran and London, the defects in Persia must effectually prevent their working satisfactorily for long. We have been always told that the management of the lines through Persia was in the hands of the local government; but whether this be so or not there is no part of the line where delays and interruptions are so frequent, or which have shown so few signs of improvement.

"Messages by the Russian route are proverbial both for their mutilation and for their delay; neither do they in every case reach their destination, as the fact that the news of the death of Lord Derby, although telegraphed from London on the 23d October, *has never yet been received in India*, proves. It was by this route that the three messages recently copied by the London press from the 'Bombay Gazette,' and which contained scarcely an intelligible word, were, I believe, received by the agent of Reuter's company at Kurrachee.

"The chief defects of the lines hitherto employed, may be then briefly summed up as follows: *First*, The want of systematic management in

Europe, by which alone the despatch of messages in proper order can be insured. *Secondly*, The character of the countries in Asia, through which the land-lines pass, is such as to render repairs at all times very difficult. *Thirdly*, A profound ignorance of the English tongue on the part of the signallers.

"Had the lines been under proper management many of the difficulties might have been overcome, and it shows how much the Anglo-Indian public have been at the mercy of foreigners, that notwithstanding breaks of two or three weeks' duration on the Turkish line alone, the Porte refused to permit the despatch of messages, by the only alternative route which would have proved of value—viz. that between Egypt and Diarbekir, the junction of the Indo-European lines. Examples have been given of the benefit the public might have derived by the systematic use of that route, and it may be accepted as a fact, that when telegrams were being delayed in Turkey from ten to fourteen days, messages from Egypt passed through Diarbekir and reached Kurrachee in less than forty-eight hours, and this not once, but frequently.

"In detailing at this length the numerous causes of the complaints which have so often arisen, of the chronic defects of the land lines between India and England, we have included many facts which are well known. One thing, however, is commonly ignored—namely, that these defects are as much the result of faulty management in Europe, as of the barbarous character of the countries in the East. The popular idea has been that the messages received at each telegraphic station were filed one after the other, and then retransmitted onwards, commencing from the top of the file. This is the law as understood and accepted by telegraph companies all over the world. We are satisfied, however, that it is practically a dead letter on the lines we are discussing. We have heard it maintained that the Turks despatch the messages at random. But even this theory would not account for such discrepancies in the order of receipt as the Anglo-Indian public have suffered from. The explanation can alone be found in the imperfect system by which hundreds of messages are sent forward to the Turkish frontier in Europe, irrepective of the delays known to exist there, whilst those of the latest date are sent by another route, which may all along have been open, and which therefore should have been used. A slight consideration will shew how easily the system might have been improved; and we repeat that, however annoying and injurious *delay* may be, it is generally agreed by merchants, who are the chief supporters of the telegraph, to be far preferable to a systematic *irregularity*."

It must be understood that both the foregoing statements, and the statistics annexed, were supplied by Anglo-Indians, who were, at the time they furnished them, smarting under the inconvenience and annoyances complained of, and that they are not in any instance taken from an official or other published report. The following brief history of the land lines, and the particulars concerning their working, are compiled, for example, from the experience of personal friends at Bombay, and more than corroborate all the general assertions contained in the memorials and letters quoted in the introductory chapter and in the appendix of this volume.

The land lines were opened for traffic about the month of March 1865, and the first message received reported the fall of Richmond, and a fall of the price of cotton to the extent of 5d. per lb. A long interruption then followed; but by 1866 the failure of the Indo-European lines had been completely demonstrated, for the in-preceding winter. In April and May of that year, although the lines were repaired, the messages often took ten to fourteen days between Kurrachee and London, and those sent were frequently anticipated by others despatched three to five days later. It was, moreover, at that time often a subject of comment that so soon as important news was received affecting the Bombay markets, an interruption at once occurred, continuing in most cases for at least a week or ten days. Thus a break of this kind took place immediately the news of the great financial panic in London was received, and it was seven days before another message reached Bombay. In June, and at the end of May 1866, a long delay occurred, and it was in consequence of this that the Agra Bank did not stop payment in India until a week or more after the doors of the bank were closed in London. Then followed the Monsoon, during which the wires were almost invariably interrupted between Kurrachee and Bombay,—messages in some cases occupying no less than eight days to reach their destination. Throughout October, November, and December, further delays took place on account of the Turkish winter, and thus it has happened that when the season is fair in India the lines elsewhere have been closed, on account of storms and snow. Only once in 1866 did a message reach Bombay in less than twenty-four hours from London, and that, reporting as it did the battle of Custozza, was scarcely credited at first because of its exceptional rapidity.

The following instances of irregularity are all taken from messages received at Bombay in January 1867:—

London Date.	Bombay Date.
	1867.
Dec. 18, 1866.	Jan. 3
" 21 "	" 4
" 22 "	" 9
" 24 "	" 9
Jan. 1, 1867.	" 13
Dec. 28, 1866.	" 14
Jan. 2 1867.	" 14
" 5 "	" 14
" 8 "	" 23
" 18 "	" 24
" 21 "	" 23
" 9 "	" 24
" 8 "	" 26
" 12, 14, 16, 17	" 25
" 18 "	Feb. 2
" 23 "	" 1
" 19 "	" 2
" 29 "	" 6

Out of 41 messages received the shortest time occupied, was . . . . 2½ days
The next shortest, . 9 "
20 were 14 days and more *en route.*
1 was 18 days *en route.*
And the others from 10 to 14 days *en route.*

In February a great improvement took place, and the average time was only three or four days. In March another break occurred, as the following instances will show:—

London.	Bombay.
Mar. 4	Mar. 6
" 7 aft.	" 8
" 7 mg.	" 25!
" 8	" 11
" 11	" 13
" 23	" 25
" 11, 12, 13	" 26
" 15, 20, 21	April 2
" 16 to 25	" 3
" 14	" 4
" 31	" 5
" 26 to 30	

In April, the winter was supposed to be over, but the following instances will show that the lines had not improved :—

1867.

London.	Bombay.	London.	Bombay.
April 5	April 10	June 1	June 4
" 4 & 5	" 15	May 31	" 8
" 11	" 15	June 5	" 8
" 10	" 16	" 5	" 11
" 2	" 16	" 14	" 16
" 13	" 17	" 8	" 16
" 12 to 16	" 19	" 11	" 19
" 17	" 20	" 17	" 21
" 6	" 23	&c.	&c.
" 8	" 23	" 25	July 7
" 9	" 23	July 6	" 8
" 10	" 23	June 27	" 8
" 18	" 22	July 2	" 10
" 24	" 27	" 5	" 11
" 4	" 30!	" 3	" 16
" 11	May 1	" 10	" 17
" 26	" 2	" 13	" 18
" 29	" 3	" 25	" 28
" 25	" 4	" 23	" 29
" 30	" 5	" 30	Aug. 4
		" 27	" 5

In May an improvement took place, the average time being 4 or 5 days, in some cases only *two*.

A message sent on the 14th reached us on the 15th, another sent on the 3d came to hand on the 20th.

The above is a fair specimen of the working of the lines throughout the year, delays in November and December being again of constant occurrence.

Throughout the whole of 1868 the same state of things continued, the lines occasionally working with regularity, but never for any length of time.

During the first six months of 1869 a great improvement was noticeable, messages arriving with tolerable regularity, and often in one or two days. Nevertheless, on several occasions delays took place.

Since the beginning of August to the present time (9th Feb. 1870) there have been constant interruptions. In August and September the average time was seven to ten days, increasing in October and November to fifteen days at least; and in the commencement of December to as much as twenty-five days. A temporary restoration took place about the 15th December, but ever since then we have seldom had messages in less than six or eight days.

A list of the times of despatch and arrival during the last four months will show more clearly the delays to which telegrams have been subject, and will of themselves prove the utter failure of the present Indo-European lines :—

1869-70.

London.	Bombay.	London.	Bombay.	London.	Bombay.
Sept. 20	Oct. 1	Nov. 3	Dec. 4	Dec. 30	Jan. 3
" 22	" 1	" "	" 7	" 11	" 3
" 21	" 2	" 12	" 8	& 13	
" 24	" 4	" 26	" 11	" 15	" 4
" 23	" 5	" 25	" 11	" 14	" 5
& 25		" 24	" 11	& 16	
" 28	" 5	Oct. 13	" 11	" 31	" 5
" 27	" 7	" "	" 11	" 31	" 6
Oct. 9	" 11	Nov. 6	" 14	Jan. 1	" 10
" 2 & 4	" 14	" "	" 15	& 3	
Sept. 23	" 4	Dec. 3	" 20	" 4	" 14
" 24	" 5	" 2	" 20	" 5	" 14
& 28		Nov. 29	" 20	" 7	" 15
Oct. 8	" 11	" 27	" 20	" 6	" 15
" 11	" 13	" 27	" "	" 8	" 17
" 1	" 13	" 29	" 21	" 7	" 17
Sept. 29	" 16	Dec. 3	" 21	" 10	" 18
Oct. 8	" 16	" 1	" 21	" 11	" 20
" 5	" 20	" 17	" 27	" 13	" 20
" 18	" 21	" 7	" 27	" 12	" 21
" 15	" 21	" 17	" 28	" 14	" 23
" 5	" 22	" 20	" 28	" 14	" 24
" 14	Nov. 1	" 9	" 28	" 15	" 24
" 22	" 2	" 28	" 29	" 21	" 24
" 13	" 8	" 20	" 29	" 21	" 24
& 15		" 22	" 29	" 17	" 25
" 20	" 6	" 23	" 29	" 22	" 25
" 29	" 6	" 23	" 29	" 18	" 25
" 21,	" 9	" 21	" 29	" 26	" 28
23, 25		" 9	" 30	" 19	" 28
" 22	" 9	" 27	" 30	" 20	" 29
" 24	" 9	" 10	" 31	" 24	" 31
& 25		" 29	" 30	" 25	" 31
" 30	" 5	" 10	" 30	" 27	" 31
" 28	" 5	" 28	" 30		
" 30	" 5	" 29	" 31		
Nov. 4	" 22				
" 1	" 22				
" 3	" 16				

THE FALMOUTH, GIBRALTAR,

AND

MALTA TELEGRAPH,

AND OTHER SUBMARINE LINES.

THE foregoing pages relate how British India has been brought into direct communication with Europe by means of a submarine telegraph cable *viâ* the Red Sea. It will be seen on reference to the map, that a telegram from Bombay now passes by cable to Malta, with the exception of a short distance across Egypt, where a land line is necessary. From Malta, the telegraph communications are at present through Italy and France. This overland route is subjected to all the risks of interruptions common to land wires; and to overcome this defect, the Falmouth, Gibraltar, and Malta Telegraph Company was organised in July 1869, and the necessary capital of £660,000 raised in London. Whilst these sheets are in the press, this cable is in the course of being laid by the Telegraph Construction and Maintenance Company. The ships in which the 2456 miles of cable necessary to join Malta to Gibraltar, Gibraltar to Lisbon, and Lisbon with Falmouth, comprise a squadron of no less than four in number—viz., the Scanderia, Edinboro', Investigator, and Hibernia, commanded by experienced seamen, and the whole undertaking under the charge of Sir Samuel Canning. In order to insure summer weather across the Bay of Biscay, the operation of submergence has commenced at Malta; thence the cable passes close to the island of Pantillaria, and in a channel which the Admiralty has caused to be carefully surveyed, and which has nowhere less than 150 fathoms depth. This channel, which has a muddy bottom, curves round Cape Bon through the Skerki Channel, and then leads along the coast of Algeria, in depths varying from 1000 to 1500 fathoms of water with muddy bottom After reaching the meridian of Cape Le Gat in Spain, the water gradually shoals from 1000 fathoms to 500 fathoms, as Gibraltar is approached. At Gibraltar the Telegraph Station will be in Rosia Bay, outside the New Mole. The entire length of this section from Malta to Gibraltar, including shore ends, will be 1212 knots. From Gibraltar, the cable, which is purposely made of a massive character to meet the strong current and irregular bottom of the Straits of Gibraltar, will be laid in a great curve round Tarifa Point and across the Bay of Cadiz to within a few miles of Cape St Vincent, which, however, will not be approached nearer than in 500 fathoms of water. At Lisbon, the landing-place is just outside the Tagus and under the shadow of Fort St Julien. The whole of the work so far will be completed by the Edinboro', Scanderia, and Investigator; from Lisbon the Hibernia takes up the work. Since this vessel came through the Suez Canal on her return from the Red Sea, she has taken on board 892 knots of cable, weighing about 2000 tons, with which the deep sea between Portugal and Penzance in Cornwall will be traversed.

There is nothing special to remark upon the type of cables employed in this undertaking, excepting that, as in the Red Sea, all the cables between Falmouth and Lisbon have been perfectly sheathed with iron wire and covered with Mr Latimer Clark's silicated compound, for the purpose of preserving the core from any damage likely to accrue to it from the teredo, which, as has been shown, in the warm waters of the Mediterranean, sometimes damages mere fibre-covered cables at extraordinary depths. The section of the cable between Lisbon and Falmouth is of the ordinary deep-sea type.

With these cables laid, England will be indeed in direct communication with her Eastern possessions; her fortresses of Gibraltar and Malta, as well as her fleets, will be in ready communication with the Home Government; and our messages to and from the East will no longer be dependent upon the goodwill or political condition of any Continental nation.

The British-Indian Extension, the China Submarine, and the British-Australian telegraph cables, now in course of manufacture, will next be laid in succession. From Madras a cable will be carried to Singapore, touching at Penang. From Singapore one line will proceed north to Hongkong, Amoy, and Shanghai, and another south to Batavia and through Java to Port Darwin, at the north of Australia. Thence a coast line will be taken round the north side of the Australian continent to Burketown, whence lines exist to Cardwell, Rockhampton, Brisbane, and Sydney, uniting with the telegraph from Sydney to Melbourne and Adelaide, and with that from Melbourne to Launceston and Hobart Town. From Hobart Town a cable is projected to New Zealand; and, to complete the circle round the world, Mr Cyrus Field and some American capitalists have been negotiating for another across the Pacific, from China to California, by way of Japan and Alaska. It may be assumed that by Christmas of this year we shall be in perfect telegraphic communication with Singapore and Batavia; in 1871, with Australia, Tasmania, and China; and that by the end of 1874* England will be supplied with news not twelve hours old from every part of the civilised globe.

"Of the enormous system thus sketched in outline" (wrote the 'Times' newspaper in January last) "it may be said that the whole will be constructed by British skill and energy, and the larger part by British capital. The cables will all be manufactured by the Telegraph Construction and Maintenance Company, and will be laid by the Great Eastern and her consorts. Excepting in the island of Java and at the Isthmus of Suez, the wires will be either submerged or upon British territory; and on the isthmus it is proposed that they shall be deeply buried. A submerged cable is practically secure. No single speculator can find any means of injuring it for his private gain. As long as England holds the empire of the sea the cables will be safe from enemies in time of war. To grapple and raise them would require not only a knowledge of their exact position and a ship specially fitted with proper apparatus and trained hands, but, also, more time than could be given to the task. The electric lines will lie beneath the great highways of traffic, and no grappling ship in search of them could herself escape notice, or, encumbered as she would be by her machinery, could avoid falling an easy prey to cruisers."

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* For the statistics of these lines see Appendix No. V., p. 325.

APPENDIX

APPENDIX No. I.

OFFICIAL RETURN FROM CAPTAIN HALPIN TO THE TELEGRAPH CONSTRUCTION AND MAINTENANCE COMPANY, LIMITED, OF THE LAYING OF THE BRITISH-INDIAN CABLE—BOMBAY AND ADEN SECTION.

1870.	Cable paid out.		Distance run.		Slack per cent.		Depth of water.	Average strain.	Average Speed.					Latitude	Longitude.	Course made good.	Remarks.
	Total.	This day.	Total.	This day.	Total length.	Day's run.			Cable.	Ship.	Paying-out drum.	Engines.					
												Screw.	Paddle.				
Feb. 14	..	...	...	...	...	...	...	Type E	...	...	...	...	...	N.	E.	...	Began paying out cable at 5 P.M. Spliced E to B^1 at 12.4 P.M. Spliced B^1 to C at 8.38 P.M.
Noon 15	98.51	...	96.	...	2.7	...	40	13.4	5.3	5.2	30.	19.1	3.9	18° 35′ 30″	71° 11′ 15″	S. 76° W.	
„ 16	228.87	130.36	216.	120.	6.	8.63	618	8.2 type B^1 6.4 type C	5.4	5.	30.5	18.2	3.9	18 12 0	69 8 0	S. 78 W.	Temperature of air in tank, 79° to 85°. Temperature of water in tank, 76° to 78°.
„ 17	359.67	130.36	328.	112.	9.6	16.78	2030	11.2	5.4	4.6	30.5	18.8	3.9	17 37 0	67 16 0	S. 73 W.	
„ 18	513.4	153.73	468.	140.	9.7	9.8	1770	16.	6.4	5.8	36.	19.6	4.6	17 5 0	64 53 45	S. 76 W.	Changed from after to fore tank at 2 A.M.
„ 19	655.22	141.82	597.	129.	9.7	9.9	1880	13.7	6.9	5.37	33.	17.9	4.1	16 32	62 45 0	S. 75 W.	
„ 20	804.33	149.11	726.	129.	10.78	15.5	2060	12.7	6.21	5.37	35.	19.4	4.2	16 6 5	60 33 0	S. 79 W.	Changed from fore to main tank at 7 A.M.
„ 21	952.47	148.14	857.	131.	11.14	13.08	2000	13.6	6.17	5.46	34.5	19.1	4.1	15 37 3	58 21 45	S. 77 W.	
„ 22	1110.98	158.51	1009.	152.	10.1	4.28	2000	13.9	6.6	6.33	37.	20.	4.5	15 0 4	55 49 0	S. 76.14 W.	
„ 23	1272.66	161.68	1161.	152.	9.61	6.36	1500	11.7	6.73	6.33	37.5	19.6	4.3	14 27	53 15 0	S. 77 W.	
„ 24	1434.66	162.	1318.	157.	8.85	3.18	1000	7.5	6.73	6.54	37.8	18.5	4.2	13 57 3	50 37 0	S. 77 W.	
„ 25	1584.37	149.71	1445.3	127.3	9.62	17.6	1160	5.	6.24	5.3	35.	18.3	4.3	13 5	48 31 30	S. 73 W.	
„ 26	1749.85	165.48	1602.3	157.	9.2	5.4	860	5.	6.87	6.54	38.5	20.5	5.1	12 47	45 53 0	S. 79.30 W.	
1 A.M. 27	1808.11	58.26	1652.3	50.	9.4	16.5	36	5 type C 16 type B^1	...	...	...	21.	5.7	12 39	45 7 30	...	6 A.M., end of intermediate cable buoyed; wind too strong to lay shore end.
March 2	1818.159	10.049	1661.95	9.65	9.4	4.	...	...	...	...	...	...	...	...	...	...	Noon, March 2d, shore end laid, and final splice made.

LENGTH OF CABLE PAID OUT.

	Type.	Miles.
Shore end at Bombay,	D^2	10.02
1st Intermediate,	E	86.046
2d do.,	B^1	50.019
Main Cable,	C	1645.415
Intermediate at Aden,	B^1	16.61
Shore end do.,	D^1	10.049
Total,		1818.159

(Signed) ROBERT C. HALPIN,
S.S. Great Eastern,
Commanding British-Indian Cable Expedition.

APPENDIX No. II.

OFFICIAL RETURN FROM CAPTAIN HALPIN TO THE TELEGRAPH CONSTRUCTION AND MAINTENANCE COMPANY, LIMITED, OF THE LAYING OF THE BRITISH-INDIAN CABLE—ADEN AND SUEZ SECTION.

1870.	Cable paid out.		Distance run.		Slack per cent.		Depth of water.	Average strain.	Average Speed.					Latitude.	Longitude.	Remarks.
	Total.	This day.	Total.	This day.	Total length.	Day's run.			Cable.	Ship.	Paying-out drum.	Engines. Screw.	Engines. Paddle.			
3rd March.	9.98	...	9.6	...	...	3.9	29 fms.	3d March.—Shore end paid out from s.s. Chiltern; end buoyed 7.5 P.M.								
6th noon.	Buoy picked up and splice made between shore end and intermediate cable. 4.40 P.M.—Commenced paying out from Great Eastern.															
7th ,, ,,	124.13	114.15	121.6	112.	2.08	1.9	94 fms.	7 cwt.	5.9	5.7	33.5	19	3.6	12° 44′ 39″ N.	43° 19′ 0″ E.	S. 68° W. 51 miles. N. 74° W. 45 ,, N. 20° W. 16 ,,
8th ,, ,,	278.59	154.46	273.6	152.	1.82	1.62	30 ,,	5 ,,	6.4	6.3	36	20.4	4.83	15 5 20 N.	42 21 45. E.	N. 22° W. 54.4 ,, N. 12° W. 32.6 ,, N. 27° W. 65 ,,
8th 7.40 P.M.	333.71	End of cable buoyed from Great Eastern, 558 fathoms, lat. 15° 41′ N., long. 41° 50′ E. March 9, 7.30 A.M.—Hibernia picked up end and made splice between types B and A. 11.40 A.M.—Hibernia commenced paying out main cable, type A.														
9th ,, noon.	335.54	56.96	321.7	48.1	4.3	18.4	502 fms.	7.5 cwt.	7.62	6.4	43	21	5	15° 41′ 15″ N.	41° 49′ 30″ E.	N. 41° 30′ W.
10th ,, ,,	481.16	145.62	454.7	133	5.8	9.5	435 ,,	21.3 ,,	7.07	5.5	32	40.5	...	17 15 20 N.	40 11 15 E.	N. 45° W.
11th, ,, ,,	636.33	155.17	604.7	150	5.2	3.44	291 ,,	13.7 ,,	6.46	6.25	34	38.6	...	19 22 0 N.	38 47 0 E.	1 P.M. Changed from main to after tank.
12th ,, ,,	793.41	157.08	725.7	121	9.33	29.8	968 ,,	18 ,,	6.54	5.04	34.5	34.9	...	21 16 54 N.	38 9 0 E.	N. 17° W.
13th ,, ,,	943.04	149.63	861.1	135.4	9.5	10.5	925 ,,	25.5 ,,	6.23	5.62	33.5	39.3	...	23 23 52 N.	37 18 33 E.	N. 20° W.
13th 1.0 P.M.	946.46	End of cable buoyed from Hibernia in 477 fms., lat. 23° 26′, long. 37° 18′ 15″. 2.30 P.M.—Chiltern took end of cable on board. 4.35 P.M.—Finished splice, and commenced to pay out from fore-tank.														
14th ,, noon.	1053.96	110.92	963.1	102.	9.43	8.74	549 fms.	18.7 cwt.	5.61	5.4	32	36.2	...	24° 48′ 2″ N.	36° 15′ 30″ E.	N. 34° W.
15th 1.40 P.M.	1196.65	142.69	1093.4	130.3	9.44	9.71	600 ,,	19 ,,	5.7	5.2	32.5	35.4	...	26 26 30 N.	34 45 0 E.	
15th 2.10 P.M.	End of cable buoyed from Chiltern, lat. 26° 26′ 30″, long. 34° 45′. 3.13 P.M.—Hibernia steamed towards Suez to meet the William Cory. 16th March, 8 A.M.—Abreast of Cory, paying out cable.															
16th 1.15 P.M. 18th ,,	William Cory cut cable and buoyed end, lat. 28° 18′, long. 33° 13′, and returned with Hibernia to Chiltern's buoy. 17th March.—Wind too strong to pick up buoy. 18th March.—Cory hauled in buoy-rope. Cable parted in lifting. 20th March, 9 P.M.—William Cory grappled cable 1¼ miles from end and spliced on. 21st March, 1.20 A.M.—Commenced paying out cable from William Cory.															
21st ,, noon.	1259.58	64.18	1149.6	57.4	9.56	11.81	600 fms.	13.9 cwt.	5.8	5.2	31	39	...	27° 15′ 0″ N.	34° 12′ 50″ E.	N. 30½° W.
22d 1.0 P.M.	1349.91	90.33	1237.3	87.7	9.09	3	150 ,,	7.5 ,,	4.7	4.6	25	28	...	28 18 0 N.	33 13 0 E.	N. 31° W. 20 mles. N. 40 W. 40 ,, S. 32 W. 3½ ,, 4.15 P.M. Final splice made on board Wm. Cory.
16th ,,	1460.15	110.24	1344.3	107	8.61	3.02	33 ,,	Shore end and main cable paid out from Suez by William Cory.								

LENGTH OF CABLE.

		NAUT. MILES.
Shore end at Aden, type D, paid out by	Chiltern,	9.98
Intermediate ,, ,, B, ,,	Great Eastern,	323.73
Main cable ,, ,, A, ,,	Hibernia,	612.75
Do. ,, ,, ,, ,,	Chiltern,	250.19
Do. towards Suez, ,, ,,	William Cory,	153.26
Do. ,, Aden, ,, ,,	,,	100.06
Shore end at Suez, ,, ,,	Hawk,	10.18
	Total length,	1460.15

(Signed) ROBERT C. HALPIN,

Commanding Expedition.

APPENDIX No. III.

The following was the programme of proceedings for laying the British-Indian Telegraph cable as fixed originally by the Telegraph Construction and Maintenance Company:—

LONDON, 18*th October* 1869.

The vessels to be employed are as follows:—

		Tonnage.	No.
Steam-Ship	GREAT EASTERN, . .	18,916	I.
Do.	HIBERNIA, ...	3,008	II.
Do.	CHILTERN, . . .	1,304	III.
Do.	HAWK, ...	733	IV.

each of whom will have the following lengths and description of cable on board:—

GREAT EASTERN.—

1874	miles of type	C
86	„ „	E
70	„ „	B^1
325	„ „	B
10	„ „	D^1
10	„ „	D^2
2375		

2375

2375			
	HIBERNIA—		
915	915 miles of type		A
	CHILTERN—		
	10 miles of type		D
250	240	„ „	A
	HAWK—		
	10 miles of type		D
60	50	„ „	A
3600			

The cable will therefore be stowed in the following order:—

Great Eastern				
In After Tank	450	miles type	C	
	50	„ „	B¹	
	86	„ „	E	
	10	„ „	D²	Shore end from Bombay.
In Main Tank	1101	„ „	C	
In Fore Tank	323	„ „	C	
	20	„ „	B¹	
	325	„ „	B	
	10	„ „	D¹	
2375				

Aggregate weight of cable will therefore be about as follows:—

	Tons.
Great Eastern,	5512
Hibernia,	2324
Chiltern,	728
Hawk,	247
	8811

The order in which the cable will be laid from the above ships will be as follows:—

The Great Eastern will lay 10 miles of shore end cable D^2 from Bombay, 86 miles of cable E and 50 B^1, and the required quantity of cable C, within 30 miles of Aden, then 20 miles of B^1 and 10 miles of D^1 shore end to Aden.

The Chiltern will then lay 10 miles of shore cable D from Aden, to which the Great Eastern will splice on Type B, and lay 325 miles in the Gulf of Aden and Red Sea. To this the Hibernia will splice on type A, and lay 915 miles. The Chiltern will then splice on type A, and complete the section between Aden and Suez, the Hawk having previously laid from Suez her portions of types D A. The surplus cable will be left on board the Chiltern.

The Great Eastern having received on board in the Medway all her cable, machinery, and equipment, will proceed to Portland on the 23d October to complete her coaling.

In the first week in November she leaves for Bombay, touching at St Vincent and the Cape of Good Hope for coals. She may be expected at Bombay early in January, where the Chiltern will join her.

The Chiltern will complete her load of cable, coals, and equipment at Greenwich, and leave the Thames on the same day that the Great Eastern leaves Portland. She proceeds to Bombay, touching at Madeira and the Cape for coals, and may be expected there early in January.

The Hibernia with the Red Sea section completes her load of coals, cable, and equipment at Greenwich, and leaves in the end of November for Aden, touching at St Vincent, and, if necessary, at the Cape, for coals. She will be at Aden in the first week in February.

The Hawk will load the Suez shore end and portion of Type A in December, and leave for Port Said so as to complete her work early in January, and put down mark-buoy.

When the Great Eastern and Chiltern have completed their coaling at Bombay, they will proceed in company, the Great Eastern laying the cable from that port to Aden. The Chiltern's station during this operation will be on the starboard quarter of the Great Eastern, keeping within half a mile of her with mark-buoys ready to let go, and to be prepared occasionally to go ahead and sound when required.

The speed of the Great Eastern when laying the cable across the deep water of the Indian Ocean should not exceed five knots per hour, and the slack cable which it is proposed to pay out will be about the same as that allowed in similar depths upon Atlantic expeditions.

The cable left on the Bombay section will not be used for the Red Sea: it will remain at the bottom of the main tank and be eventually landed at Aden.

When the Hibernia, Great Eastern, and Chiltern are ready to leave Aden, the three ships will sail in company. The Hibernia being ready to splice and take up the work from the end of the Great Eastern's cable.

The Great Eastern then returns to Aden to discharge surplus cable and to complete coaling for the voyage home.

The Hibernia and Chiltern proceed up the Red Sea in company. The Chiltern being ready to splice to the end of the Hibernia's cable, and thence to complete the work up the Gulf of Suez. The Hawk will have at this time laid the shore cable and buoyed her end of Type A. Charts of the proposed line of cable will be given to the captains of each ship, in order that should the ships part company in a fog, any ship having missed the Great Eastern (or the ship that is paying out the cable) can steam ahead along the line of cable to a point that the Great Eastern (or ship then paying out) cannot have reached, and then can return along the course with the view of finding her.

In event of any important change being discovered in the deviation of any of the ship's compasses or discrepancy in their positions at noon, or when asked for, it shall be immediately made known to the other ships, with a view of finding out the cause.

At any time that the Great Eastern may be heard firing guns, it is to be understood by the accompanying ships that they are at once to close on the Great Eastern and communicate.

In case of a fault being discovered in paying out, a signal will be immediately made to the bridge and paying-out machinery, the engines reversed, and as soon after as possible operations commenced to heave in the cable.

Before starting from Bombay and Aden the ships will have marked buoys rigged and ready to let go so that no time may be lost in the event of an accident occurring

Maryatt's signals to be used, except in case of fog, when the system will be by steam-whistle and indicating Roman numerals, the vessels being distinguished by the Nos. I. II. III. IV., as follows:—

Thus—No. of Ship, say IV., will be signalled—

●	▬
Short Whistle, 3 seconds.	Long Whistle, 10 seconds.

Sounding (in 100 fathoms), say VIII.,

▬	● ● ●
Long Whistle, say 10 seconds.	Short Whistles, say 3 secs. 3 secs. 3 secs.

HENRY CLIFFORD,
Engineer.

ROBERT C. HALPIN,
Commanding the Expedition.

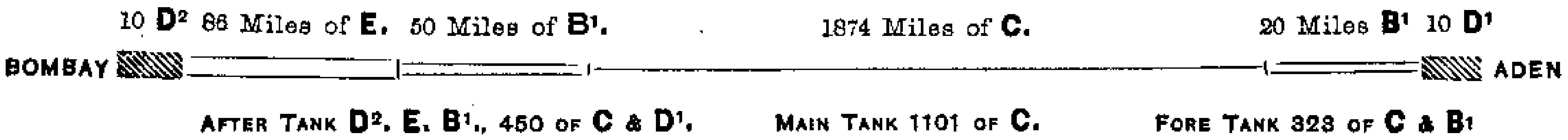
Approved by the Board of Directors,

SHERARD OSBORN,
Managing Director.

BRITISH-INDIAN CABLE.

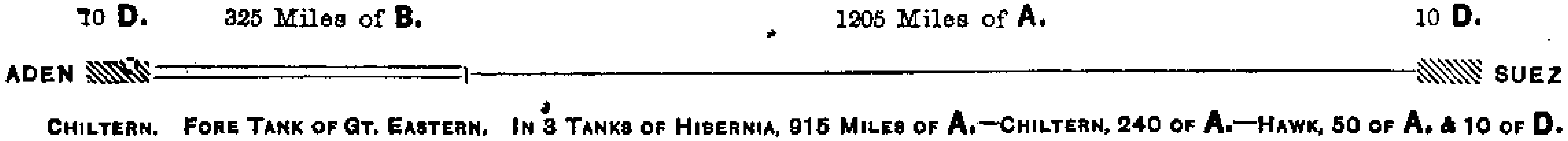
BOMBAY AND ADEN SECTION,

Shipped on Board Great Eastern.


10 D^2 86 Miles of E. 50 Miles of B^1.
1874 Miles of C.
20 Miles B^1 10 D^1
BOMBAY
ADEN
AFTER TANK D^2. E. B^1., 450 OF C & D^1.
MAIN TANK 1101 OF C.
FORE TANK 328 OF C & B^1

ADEN AND SUEZ SECTION,

Shipped on Board Great Eastern, Hibernia, Chiltern, and Hawk.


10 D.
325 Miles of B.
1205 Miles of A.
10 D.
ADEN
SUEZ
CHILTERN.
FORE TANK OF GT. EASTERN.
IN 3 TANKS OF HIBERNIA, 915 MILES OF A.—CHILTERN, 240 OF A.—HAWK, 50 OF A. & 10 OF D.

The following were the instructions issued by the Electrical Department to Ship and Shore:—

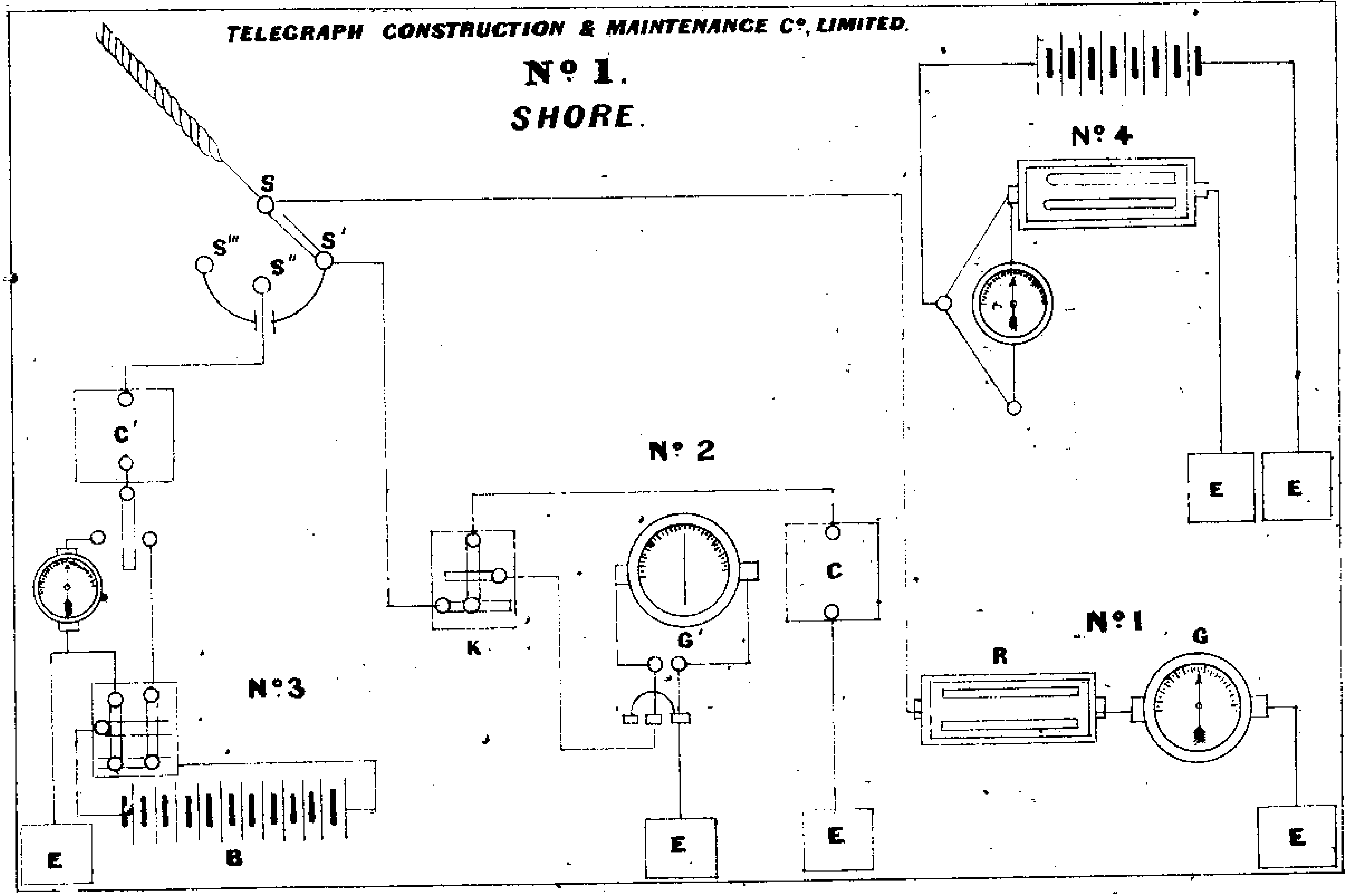
ELECTRICAL DEPARTMENT.

1. The instruments on shore are to be connected, as shown in the accompanying diagram, and not to be altered under any pretence throughout the voyage, unless instructions are received from ship to do so.

2. The end of the cable must be brought direct to the test-room, and the conductor firmly secured to the switch *S*.

3. No. 1 arrangement consists of a very high resistance *R*, permanently attached to the conductor, and one terminal of a galvanometer *G*, the other terminal of the galvanometer being connected to earth. The resistance must be so adjusted as to allow a deflection of about 200 divisions on the scale *G* from the tension of the ship battery. This deflection never, on any account, to be allowed to exceed 300. The purpose of this arrangement is to enable the ship to signal to shore by either reversals or reduced tension. It is also an insulation and continuity test for shore. As this arrangement will not require to be altered during the voyage, to insure a good and constant contact, the connection had better be soldered to the conductor.

4. No. 2 arrangement consists of a condenser *C*, connected to an ordinary key *K*, in such a way that it can be charged from the line at will, and discharged through the galvanometer *G*. This is to serve for a continuity

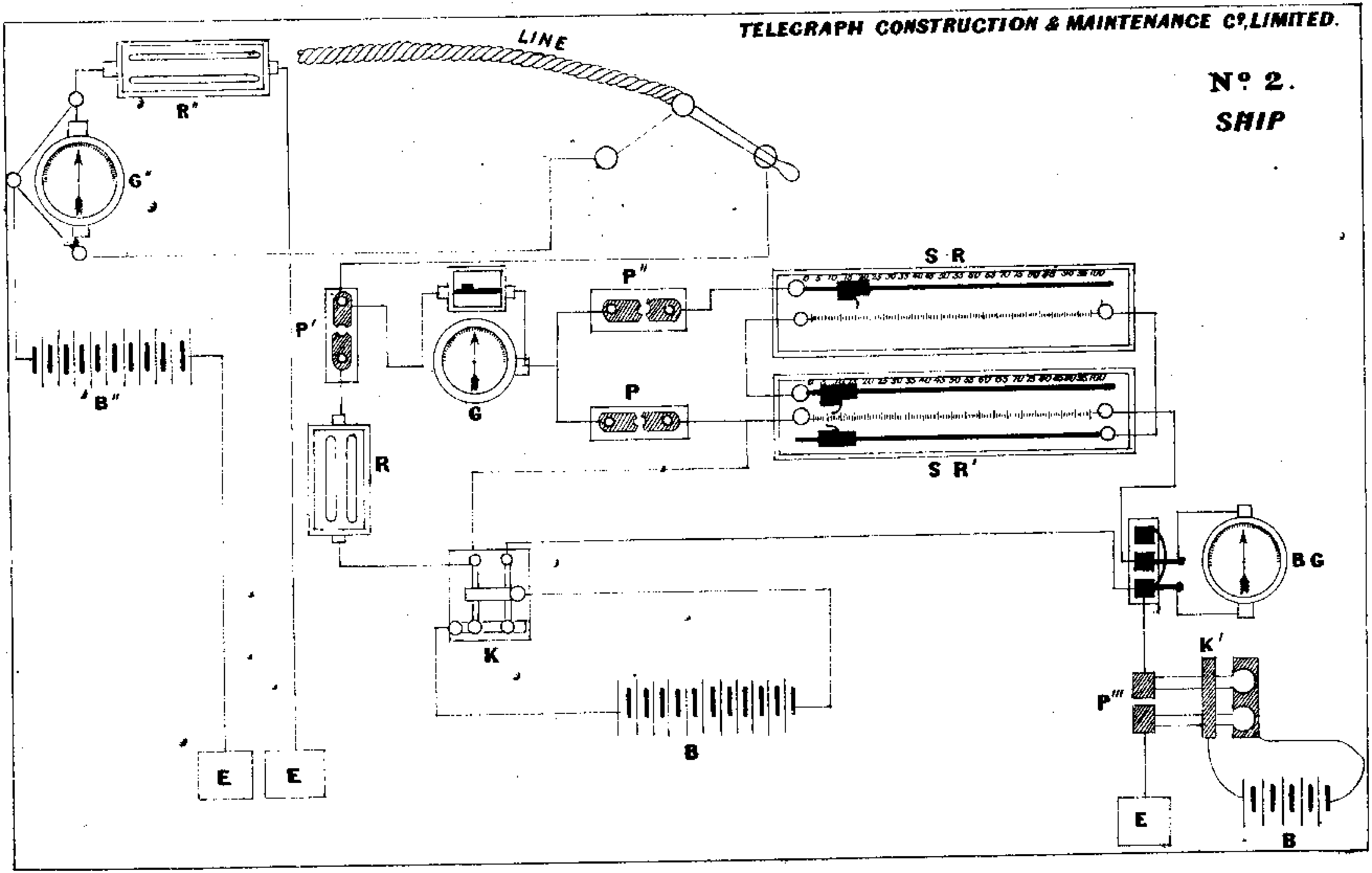


TELEGRAPH CONSTRUCTION & MAINTENANCE Co. LIMITED.

No 1.

SHORE.

W.& A.K. Johnston, Edinburgh.



TELEGRAPH CONSTRUCTION & MAINTENANCE Cº LIMITED.

Nº 2.

SHIP

W & A.K. Johnston Edinburgh.

test for ship, to ascertain the potential of the line at the shore-end, and as a call signal when shore wishes to speak to ship.

5. No. 3 is an arrangement for enabling shore to speak to or receive from ship through a condenser C', which is connected to the line when required by means of the switch S''', so that either positive or negative currents from battery B may be sent into the condenser. This will produce on ship's insulation galvanometer deflections either to right or left, which will represent dots and dashes in the Morse code; the left, or negative, being equivalent to a dot, the right, or positive, to a dash.

6. No. 4 is an ordinary bridge arrangement for testing the copper resistance of the line. It must be kept ready for use, but must not by any means be connected to the line until ship gives orders for the test to be made. It can then be attached to switch S by the wire leading to resistance R, and it will thus not interfere in the slightest degree with the other connections.

7. The cable on board each ship will be joined into one entire length, and when joined to the shore end, ship will charge and commence the insulation test with 100 cells. This tension will be maintained throughout the voyage, unless it should be thought prudent to alter it, of which due notice will be given to the shore.

8. The resistance R on shore must be so adjusted as to obtain the desired deflection on galvanometer G, and must not again be altered, unless the deflection exceed

300 divisions; or unless a serious fault occur, when it will have to be reduced until a sufficient deflection is obtained to enable ship to signal to shore. The deflections must be taken at stated intervals, directly after the zero of the instrument has been adjusted, and carefully tabulated for future reference.

9. The continuity test will be applied every five minutes, commencing at the sixth minute after each hour (unless shore is speaking to ship, when it can be discontinued during the time of speaking), and the discharge reading carefully tabulated. One charge of 10 s. duration will be sufficient for this test. It is important, in order to make this reading very accurate, that it should be as high as possible, and therefore the readings should always be taken on the same side of the scale, with the zero point at the extreme end of the other side, by which means a reading of 600 divisions can be obtained. Shunts will have to be employed to regulate these readings. Shore must multiply these readings by the value of the shunt, and enter the true value of each reading.

10. Ship will reverse the current every fifteen minutes, commencing at the hour, unless signals are passing between ship and shore, when it will be discontinued during the time of speaking.

11. Ship's ordinary mode of communicating to shore will be by K' (Diagram No. 2) and B', the plug P''' being first removed. At the end of each word ship pauses long enough to get an approximate or accurate insulation reading.

12. To sum up, the ordinary tests will be as follows:—Continuity test from shore, when not otherwise provided, every five minutes, commencing at the sixth minute after each hour.

13. Ship will reverse current every fifteen minutes, when not otherwise engaged.

14. To open communication with shore, ship will give three 20 s. reversals, which will be continued with pauses between until shore end gives the "understand."

15. Shore's call signal will be one continuity test each minute until attention is secured. *GG* will be ship's signal for shore to commence speaking, but a reversal from ship will mean that shore is not to proceed speaking until *GG* signal is given. *GG* would not be doubtful in case of fault.

16. If it be found necessary to add to or alter any of these instructions, ship will do so by giving due notice to shore; but in no case is shore to depart from their instructions, unless ship gives permission to do so.

17. Should ship reverse the current while shore is speaking, or at any other time than that stated in the instructions, shore will understand it as a signal for them not to interfere in any way with the line, until ship gives four 10 s. reversals, when the ordinary signals or speaking may be proceeded with.

18. Ship will work to Greenwich time by chron-

ometer, and shore must take that time as being correct, and work to it.

19. Should a misunderstanding arise while adjusting speaking instruments, after the line or lines are laid, the paying-out speaking arrangements must be again adopted.

20. Records of the tests made and results obtained are to be carefully kept both on ship and shore.

21. Once a-day ship will send distance run, and miles paid out, with such additional words as the Board of Directors shall authorise.

Special Instructions for Ship.

1. The connections are to be made as in Diagram No. 2.

2. For ordinary insulation test plug P must be inserted, and P' and P'' removed.

3. Minute readings must be taken on G and recorded. Slide resistance SR and SR' must not be used or interfered with except by the electrician on duty at the time. When required to ascertain the resistance of the GP by the slide arrangement, the plug P must be removed, and P' and P'' inserted. When altering connections, care must be taken to shunt off the galvanometer G, so as not to allow too strong a current to pass through it.

The resistance of SR and SR' must be varied by the slides until the image on the scale of G stands at zero.

If n be the number read on the slides,

R „ resistance in line with cable,
I „ Insulation resistance of the cable,

Then $I = R\left(\frac{10{,}000}{n} - 1\right)$.

The same formula gives copper resistance if the remote end is put to earth.

(Signed) WILLOUGHBY SMITH,
Electrician-in-Chief.

Authorised by the Board of Directors,

(Signed) SHERARD OSBORN,
Managing Director.

APPENDIX No. IV.

MEMORIAL FROM THE CITY OF LONDON.

LONDON, 18*th April* 1868.

To the Right Honourable
Sir STAFFORD H. NORTHCOTE, Bart., M.P.,
Her Majesty's Secretary of State for India in Council.

SIR,—On the 7th November last, a Memorial was addressed to the Secretary of State for India by certain members of the commercial body of London, in which it was represented that the existing methods of telegraphic communication with India and the East had been showed by a Committee of the House of Commons, in 1866, to be "imperfect in their organisation, inefficient in their working, and liable at any time to interruption from political and other causes entirely beyond the control of the British Government."

Since the date of that memorial, the imperfections of the system have further manifested themselves in so serious a manner, as greatly to increase the general dissatisfaction, and to render very grave and urgent the necessity for improvement.

Accordingly, a large and influential meeting of Merchants, Members of Parliament, and others interested in the question, was held at the Mansion House, under the presidency of the Right Hon. the Lord Mayor, on the

23d ultimo, and it was then determined to take the earliest opportunity of again pressing the subject on the attention of her Majesty's Government.

In pursuance of that resolution, we now address you respecting the great inefficiency of the present system, earnestly hoping that it may receive your early and careful consideration.

We submit that the existing telegraphic communication with the East, by means of the Persian Gulf cable, to reach which at Bussorah messages must be transmitted through the hands of almost every Government in Europe, from France on the one side to Russia and Turkey on the other, and through a large and very uncivilised portion of the Turkish and Persian dominions in Asia, has been proved by the experience of three years' working to be altogether inadequate to the requirements of the age.

The Government of India has made great efforts and spent large sums to improve the line; notwithstanding which, the delays, uncertainty, inaccuracy, and irregularity in the order of the transmission of messages continue as great as when the line was first opened.

It may be admitted that very considerable improvement might be effected, were it possible to arrange with the Governments through whose territories the line passes to have it placed solely under English control, but there would still remain, even then, what we venture to consider an insuperable objection to the present system—viz., that the communications would be liable to be cut off at any moment by the occurrence of some European or Asiatic complication, such as, in the existing condition of what is called the Eastern question, cannot be considered in any degree unlikely.

The perfection recently attained in submarine telegraphy offers an easy and complete solution of the difficulty.

A submarine communication from one of the south-western ports of England to Gibraltar, and thence by Malta to Alexandria, with a cable down the Red Sea and across the Indian Ocean to Bombay, would, with the line through Egypt, which is now under British management, complete an independent British system from England to India, under one uniform management and control, and open to no foreign interruption or interference, except in the short and unavoidable distance between Alexandria and Suez.

Such a line would insure as much speed, regularity, and accuracy in the transmission of messages between England and India as at present exists between England and America, and would quickly lead to the extension of telegraphic communication to the Straits settlements, China, and Australia.

The reply of the Secretary of State for India to the memorial of last November seemed to indicate that as, in his opinion, the improvement of telegraphic communication with the East was a matter primarily affecting the commercial public, the interference of Government was uncalled for.

We most respectfully submit, however, that, important though the commercial interests involved undoubtedly are, they are only secondary to the great national stake which Great Britain has in the East; and we express the feeling, not of merchants only, but of all in the nation who take any interest in her Eastern possessions, when we urge that this matter should be treated as an important imperial question.

One more consideration we venture to urge is, that the establishment and maintenance of efficient telegraphic communication between the various parts of the empire is as much a duty of Government as the maintenance of the postal service.

The attempt to raise, without assistance from Government, sufficient capital to lay a submarine cable from Suez to India has hitherto failed, not from the chance condition of financial credit which a few months may alter, but because the public felt that Government, having laid and worked the Persian Gulf line, had accepted the responsibility of establishing effective telegraphic communication with the East, and that it would therefore be risking a rivalry with Government to attempt to establish an independent line;—and further, that the maintenance of the short line through Egypt involves political risks with which Government alone is competent to deal.

We trust that the great magnitude of the interests involved in this question may justify us in again bringing it before her Majesty's Government, and in earnestly praying that it may receive that early and favourable consideration to which it is so justly entitled. We would pray, first, that the Government should consider the propriety of itself constructing and working the line, or, if that be for any good reason declined, that it would at all events express a willingness to assist, in some fitting method, associated private enterprise in carrying out the undertaking.—We have the honour to be, sir, your obedient servants,

W. F. ALLEN, *Lord Mayor.*
For the ORIENTAL BANK CORPORATION—P. CAMPBELL, *pro Chief Manager.*

For the CHARTERED MERCANTILE BANK OF INDIA, LONDON, and CHINA—D. T. Robertson, *Chief Manager.*

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J. W. CATER, SONS, & CO.
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THE EASTERN BENGAL RAILWAY CO.—J. F. LEITH, *Chairman.*
BOMBAY AND BARODA RAILWAY—P. T. FRENCH, Lieutenant-Colonel, *Chairman.*
OUDE AND ROHILKUND RAILWAY CO.—W. JOHNSTON, *Managing Director.*
GREAT INDIAN PENINSULAR RAILWAY CO.—THOMAS A. WATT, *Managing Director.*
MADRAS RAILWAY COMPANY—J. A. WALKER, *Chairman.*
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DELHI AND LONDON BANK (LIMITED)—W. MACRITCHIE, *Secretary.*

STRAITS SETTLEMENT ASSOCIATION—W. NAPIER, *Chairman.*

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W. BOWDEN, JUN., Cirencester.

W. C. PALMER (CAPTAIN), 14 St James's Square.

H. BARBER, Greenbank, Falmouth.

PRAGJEE BHEMJEE.

NEAL PORTER.

HORMADJI PESTONJI.

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E. F. MAXSTEAD, *President of the Hull Chamber of Commerce and Shipping.*

J. M. BENNETT, *President, Chamber of Commerce, Manchester.*

RICHARD CRIPPS, *Chairman, Bristol Chamber of Commerce.*

PATRICK PLAYFAIR, *Vice-President, Chamber of Commerce and Manufactures, Glasgow.*

APPENDIX No. V.

Abstract of the proposals made to the Secretary of State for India in December 1866 by the Telegraph Construction and Maintenance Company.

That the telegraph line from Susa to Suez shall be continued from Suez to Bombay by a submarine cable from Suez, or other point in the Red Sea to Aden, from Aden to Kooria Mooria, and thence, in a direct line, to Bombay.

The Directors urged on his Lordship's attention the important fact that the line proposed would place England in direct telegraphic communication with our important possessions in Hindustan, and that at Aden communications arrive almost daily from China, Japan, and Australia, as well as from the Dutch, French, and Spanish colonies, and by a weekly mail from the Cape of Good Hope, Mauritius, Bourbon Seychelles, and the east coast of Africa.

This line would not exceed 3654 nautical miles in length; and, from estimates carefully prepared by the Company's engineers and electricians, the cost of a thoroughly efficient cable, in all respects the most suitable for the purpose, including stations and instruments, and all expenses of making and laying the line, would be £1,100,000.

Should your Lordship and the Council sanction the proposal, this Company would at once undertake the work, and complete in twelve or fifteen months (if the order be given within a reasonable time from the present date) and guarantee the completion of the line in a thoroughly efficient condition.

It will be obvious to your Lordship and the Council, that in the present state of the English money-market, it would be almost impossible, even after the recent triumphs in submarine telegraphy accomplished by this Company, to endeavour to raise such a capital without the assistance of the Government.

The Directors have anxiously considered in what way this assistance might be given so as to be least burdensome to the Government, and yet sufficiently beneficial to the public to induce them to subscribe the required capital.

After some calculations as to the amount of traffic to be expected, and a statement of the contract formed between Messrs Glass, Elliot, & Co., the predecessors of the Company, and the Government, with respect to the Malta and Alexandria line, the Directors went on to say that the proposal had been brought under your Lordship's notice, not professing it to be all that is requisite to complete the system of telegraphic communication with India, but under the conviction that it is the first and most important step now necessary to be taken.

If the route here recommended be adopted, the necessity for transmission of telegraphic messages through desolate countries, or those tenanted by semi-barbarous races, is altogether avoided, and from Suez to Bombay would be safe from interference at any points except the two intermediate stations of Aden and Kooria Mooria, both of which places will be in English hands.

It may be confidently assumed, since the successful laying and maintenance in perfect efficiency by this Company's engineers of the Atlantic cables, and numerous other submarine lines, that the depth of the ocean offers the best assurance of the permanence of a Submarine Telegraph, and its exemption from destruction and injury either by accident or at the hands of an enemy during war.

It will doubtless be objected that the proposed route will still leave the traffic open to interruption in its passage through Italy and France.

In regard to this I may observe that so far as it is practicable my Company have, by prearrangements and conventions, guarded the traffic from the danger suggested, and secured for it a line worked (beyond France) entirely by Englishmen devoted solely to this duty.

The liability to interruption from war or political disturbances in Europe can only be obviated by the laying of a submarine line from Falmouth to Malta.*

The Directors have examined this question also, and would be prepared to make and lay such a line for £850,000, and it will be for your Lordship's Government to consider whether the imperial interests concerned are not of sufficient importance to justify the expenditure of that amount in order to place the telegraphic communication with our Mediterranean Arsenals, with the east, with the Cape of Good Hope, and with our Australian Colonies, in safety in case of war.

APPENDIX No. VI.

THE following particulars relate to the chief submarine telegraphic lines now before the public:—

Name of Company, &c.	Capital.	Length of Cable.	When Contract was or is to be completed.	Date of forming of Company.
	£	Miles.		
Anglo-American Telegraph Company, (Two cables, Valentia to Newfoundland), .	1,360,000 ('65) 600,000 ('66)	1,898 1,852	Sept. 8, 1865 July 27, 1866	March 1865
French Atlantic Telegraph Co. (Brest to Boston), ...	1,200,000	1,333	July 20, 1869	July 1868
Falmouth, Gibraltar, and Malta Telegraph Company, .	600,000	2,456	May 31, 1870	July 1869
Anglo-Mediterranean Telegraph Company (Malta to Alexandria), ...	260,000	900	Oct. 1868	May 1868
British-Indian Telegraph Co. (Suez to Bombay), ...	1,200,000	3,600	April 1870	Jan. 1869
British-Indian Extension Co. (Ceylon to Penang and Singapore), ...	460,000	1,756	Before end of 1870	Oct. 1869
China Submarine Telegraph Co. (Singapore to Hongkong and Shanghai), . . .	525,000	2,640	June 1871	Dec. 10, 1869
British-Australian Telegraph Co. (Singapore to Java and Port Darwin), . .	660,000	1,726 800 land	Before end of 1871	Jan. 1870
Total capitals, £	6,925,000	20,961—Total miles.		

IMPERIAL

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